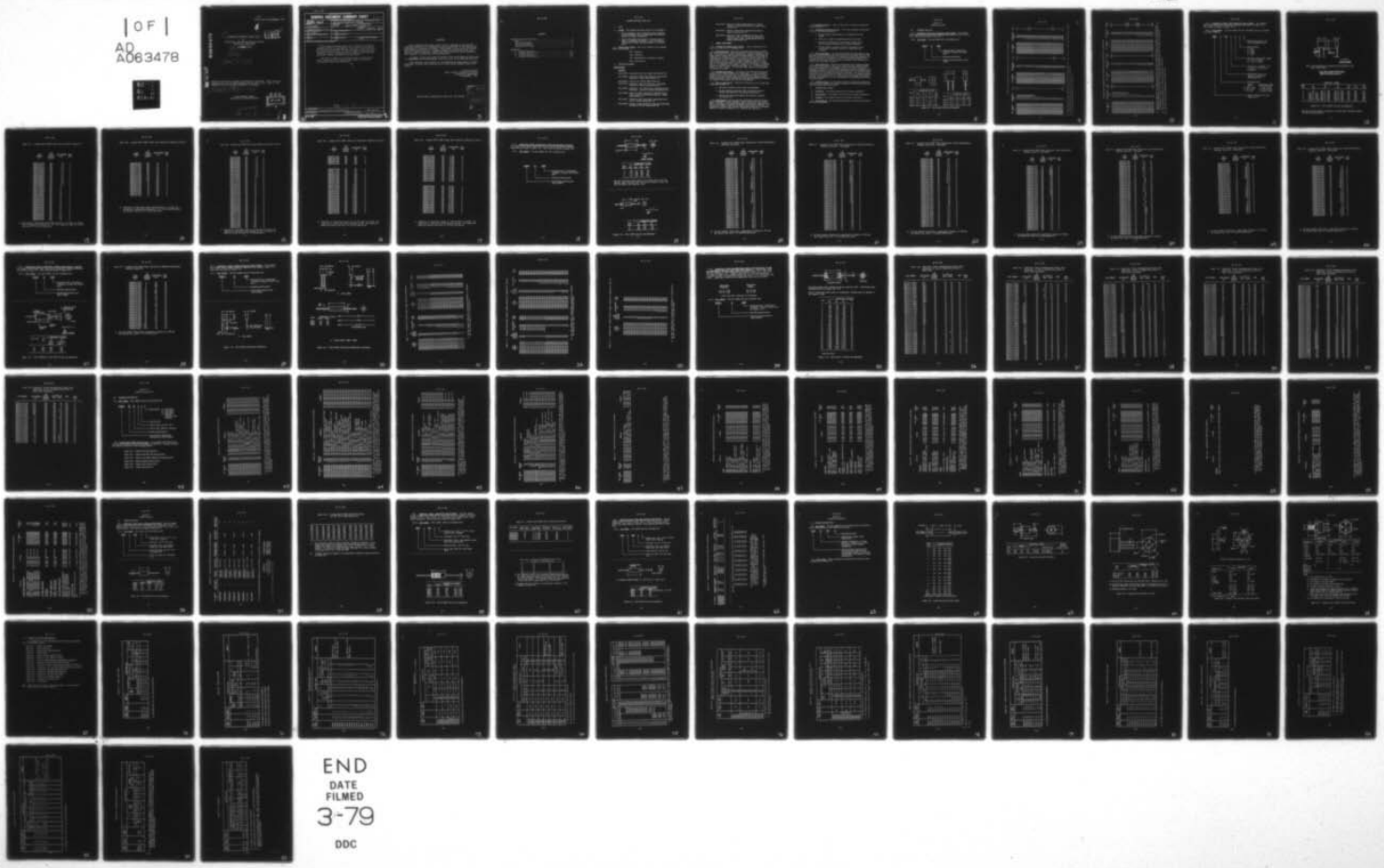
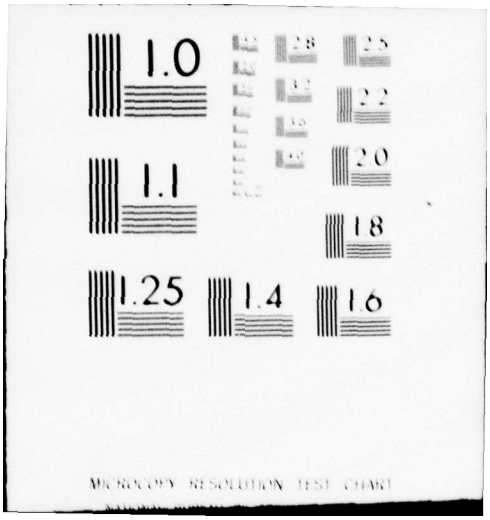
AD-A063 478 NAVAL WEAPONS CENTER CHINA LAKE CALIF F/G 15/5
STANDARD ELECTRONIC PARTS LIST.(U)
SEP 77
UNCLASSIFIED NWC-TM-3280 GIDEP-E095-1367 NL

| OF |
AD
A063478



END
DATE
FILMED
3-79
DDC


1.0
1.1
1.25
1.4
1.6
2.0
2.2
2.5
2.8
18
MICROCOPY RESOLUTION TEST CHART

95-1367

(9) NWC Technical Memorandum 3280

(6) STANDARD ELECTRONIC PARTS LIST.

by

Reliability and Maintainability Branch
Engineering Department

(11) September 1977

(12) 85p.

(14) NWC-TM-3280

LEVEL II

AD A063478

DDC FILE COPY

(18) GIDEP (19) E0995-1367

NAVAL WEAPONS CENTER
China Lake, California 93555

403 019

78 11 28 121

MAY 25 1978

GOVERNMENT-INDUSTRY DATA EXCHANGE PROGRAM

GENERAL DOCUMENT SUMMARY SHEET

1 OF 1

Please Type All Information – See Instructions on Reverse

1. ACCESS NUMBER	2. COMPONENT/PART NAME PER GIDEP SUBJECT THESAURUS	
E095-1367	General Technical Data, Multi-Part/Components Reports	
3. APPLICATION: Procurement	4. MFR NOTIFICATION: ☐ NOTIFIED ☒ NOT APPLICABLE	5. DOCUMENT ISSUE (Month/Year): September 1977
6. ORIGINATOR'S DOCUMENT TITLE: Standard Electronic Parts List		7. DOCUMENT TYPE: ☐ GEN RPT ☐ NONSTD PART ☒ SPEC
8. ORIGINATOR'S DOCUMENT NUMBER: NWC TM 3280	9. ORIGINATOR'S PART NAME/IDENTIFICATION: N/A	
10. DOCUMENT (SUPERSEDES) (SUPPLEMENTS) ACCESS NO.: None	11. ENVIRONMENTAL EXPOSURE CODES: N/A	
12. MANUFACTURER: N/A	13. MANUFACTURER PART NUMBER: N/A	14. INDUSTRY/GOVERNMENT STANDARD NUMBER: N/A

15. OUTLINE, TABLE OF CONTENTS, SUMMARY, OR EQUIVALENT DESCRIPTION

This Standard Electronic Parts List is intended to provide the technical baseline for standardizing parts selection in the design and production of electronic systems. The intent of this list is to focus part selection efforts on a reduced number of parts with known reliability, thereby reducing systems and logistics costs while improving part quality, reliability, and availability.

This list is limited to the following types of electronic devices: Capacitors, Fixed; Microcircuits; Resistors, Fixed; and Semiconductors (Diodes and Transistors).

78 11 28 121

16. KEY WORDS FOR INDEXING: Parts List; Microcircuits; Semiconductors (Doc Des--S)

17. GIDEP REPRESENTATIVE	18. PARTICIPANT ACTIVITY AND CODE
M. H. Sloan	Naval Weapons Center, China Lake, CA (X7)

DD FORM 1 OCT 77 2000

85

2

FOREWORD

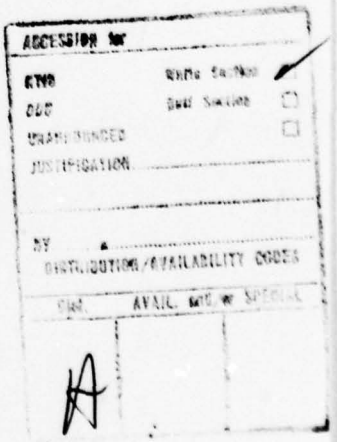
This Standard Electronic Parts List is intended to provide the technical baseline for standardizing parts selection in the design and production of electronic systems. The intent of this list is to focus part selection efforts on a reduced number of parts with known reliability, thereby reducing systems and logistics costs while improving part quality, reliability, and availability.

In order to meet the changing needs of the Naval Weapons Center and to accommodate new technologies, this list will be revised periodically.

This document was prepared by the Engineering Department's Product Assurance Division with funding from various Naval Weapons Center Programs.

Dillard Bullard
Head, Product Assurance Division
Engineering Department
23 September 1977

NWC TM 3280, published by Code 231, 200 copies.



CONTENTS

4

STANDARD ELECTRONIC PARTS LIST

1. SCOPE

1.1 Purpose. This standard electronic parts list is intended to:

a. Provide designers a list of electronic parts considered the most acceptable for new designs based on reliability history and present availability.

b. Control and minimize the variety of electronic parts in order to concentrate improvement on, and to facilitate effective and economic logistical support of, electronic parts.

1.2 Federal stock classes. This list is limited to the following Federal Stock Classes.

5905 - Resistors

5910 - Capacitors

5961 - Semiconductors (transistors & diodes)

5962 - Microcircuits

2. APPLICABLE DOCUMENTS

SPECIFICATIONS

MILITARY

MIL-S-19500 - Semiconductor Devices, General Specification for

MIL-C-23269 - Capacitors, Fixed, Glass Dielectric, Established Reliability, General Specification for

MIL-M-38510 - Microcircuit, General Specification for

MIL-C-39001 - Capacitor, Fixed, Mica Dielectric, Established Reliability, General Specification for

MIL-C-39003 - Capacitor, Fixed, Electrolytic (Solid-Electrolyte), Established Reliability, General Specification for

MIL-C-39006 - Capacitor, Fixed, Electrolytic (Nonsolid Electrolyte), Tantalum, Established Reliability, General Specification for

MIL-R-39007 - Resistors, Fixed (Power Type), Established Reliability, General Specification for

MIL-R-39008 - Resistor, Fixed Composition (Insulated) Established Reliability, General Specification for

MIL-C-39014 - Capacitor, Fixed, Ceramic Dielectric (General Purpose), Established Reliability, General Specification for

MIL-R-55182 - Resistor, Fixed Film, Established Reliability, General Specification for

MIL-C-83421 - Capacitor, Fixed, Supermetalized Plastic Film Dielectric, (dc, ac, or dc and ac) Hermetically Sealed in Metal Cases, Established Reliability, General Specification for

3. GENERAL REQUIREMENTS

3.1 Criteria for standard parts listing. A part is listed only if it meets all criteria in 3.1.1 through 3.1.5.

3.1.1 Application need. There must be multiple applications requiring the specific performance capability peculiar to the part proposed for listing. Consideration is given to selecting parts capable of satisfying the widest range of design applications and, when applicable, parts should be compatible with existing listings (e.g., select a reference diode that is an extension of a listed series, or a microcircuit that is generic to a family already listed). A definite need is assumed to exist for a part that has been used successfully in several recent applications, provided that it is nonredundant, with respect to form, fit or function, to existing listings or provides other compelling advantages (i.e., continuing availability) over such listings. In the latter case, deletion of the original listing may be in order.

3.1.2 Technological maturity. The design of the part must be finalized and must utilize proven materials and technologies. It must have been in production for a period sufficient to provide assurance that the critical design and process parameters have been identified and adequate controls have been developed. The technology also must have demonstrated suitability for equipment environmental and life-cycle requirements.

3.1.3 Test or usage history. There must be sufficient test or usage experience with the part to:

a. Determine predominant failure modes and mechanisms.

b. Provide reasonable confidence that the part will perform reliably when supplied to an adequate specification.

c. Identify the derating and application restraints necessary for reliable use.

3.1.4 Specification. The part must have an adequate specification that defines performance, design, materials, quality controls and test requirements. Parameters in the specification shall realistically characterize the part over its range of specified environment and operating conditions. An established reliability (ER) military specification generally is considered adequate for passive components (i.e., resistors and capacitors).

3.1.5 Qualified supplier. A part is listed only if there is at least one qualified supplier.

3.2 Standard part removal criteria. A part may be removed from the list for any of the following reasons:

a. The part becomes obsolete and is not appropriate for new designs.

b. There are no longer any qualified sources for the part.

c. The part is replaced with a functionally similar device having improved characteristics or better reliability.

d. The part exhibits inherent reliability problems for which no economically adequate controls or screens have been developed.

3.3 Parts procurement. All parts listed herein must be procured to the applicable detailed military specifications and must be marked with the "JAN" brand (or approved abbreviation) which signifies satisfactory compliance with all the specification requirements. The "ordering data" paragraph of the detailed specifications should be consulted to assure proper information is listed in the procurement document.

3.4 Parts application. The parts listed herein must be properly applied and derated by the user for them to give satisfactory and reliable performance. The equipment shall be designed so that it will meet the specified performance, reliability, and derating requirements when using standard parts. Standard parts must be used only for those characteristics or parameters which are controlled by the applicable detail specifications. The use of the standard parts listed herein does not relieve the contractor (or hardware designer/builder) of the responsibility for complying with all equipment performance and other requirements set forth in the applicable system/equipment specification and contract.

3.5 Conflict of data. In the event of conflict between the technical description of the standard parts described herein and the applicable specification, the specification shall govern.

4. STANDARD PARTS LISTING

4.1 Capacitors. The standard capacitors are listed in Appendix A.

4.2 Microcircuits. The standard microcircuits are listed in Appendix B.

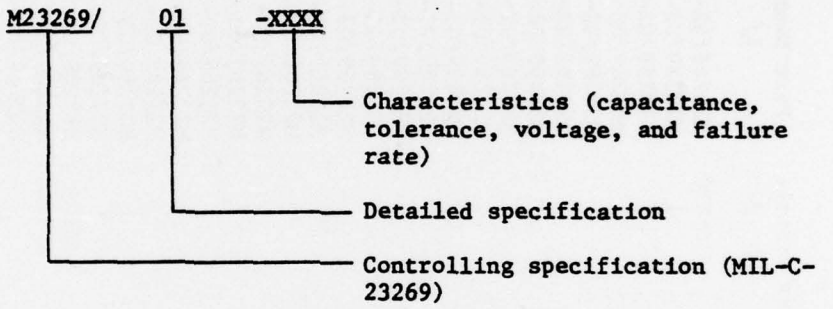
4.3 Resistors. The standard resistors are listed in Appendix C.

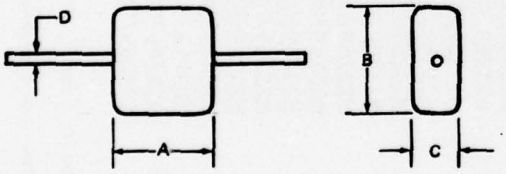
4.4 Semiconductors. The standard semiconductors (transistors and diodes) are listed in Appendix D.

10. STANDARD CAPACITORS

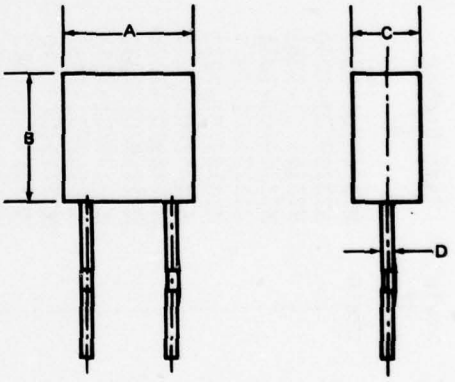
10.1 Capacitors, fixed, glass dielectric (MIL-C-23269). The standard MIL-C-23269 fixed, glass dielectric capacitors are listed in Tables 10-1a and 10-1b. Part sizes are shown in Figure 10-1.

10.1.1 Part number. The part number has the following form:





Style	Dimensions (inches)			
	A Max	B Max	C Max	D +.004 -.001
CYR10	.391	.203	.109	.020
CYR15	.516	.297	.156	.020
CYR20	.796	.469	.188	.025
CYR30	.812	.828	.188	.025



Style	Dimensions (inches)			
	A Max	B Max	C Max	D ±.002
CYR51	.305	.210	.120	.020
CYR52	.305	.310	.120	.020
CYR53	.505	.310	.120	.020

Figure 10-1. MIL-C-23269 Outline and Dimensions

8

Table 10-1a. Standard MIL-C-23269 Fixed, Glass Dielectric Capacitors

Part Number 1/	Capacitance (pF)	Style 3/	Part Number 1/	Capacitance (pF)	Style 3/	Part Number 1/	Capacitance (pF)	Style 3/
M23269/01-7001	0.5 2/	CYR10	M23269/01-7057	33	CYR10	M23269/02-7036	620	CYR15
M23269/01-7002	1.0 2/		M23269/01-7060	36		M23269/02-7039	680	
M23269/01-7003	1.5 2/		M23269/01-7063	39		M23269/02-7042	750	
M23269/01-7004	2.2 2/		M23269/01-7066	43		M23269/02-7045	820	
M23269/01-7006	2.7 2/		M23269/01-7069	47		M23269/02-7048	910	
M23269/01-7007	3.0 2/		M23269/01-7072	51		M23269/02-7051	1,000	
M23269/01-7009	3.3 2/		M23269/01-7075	56		M23269/02-7054	1,100	
M23269/01-7010	3.6 2/		M23269/01-7078	62		M23269/02-7057	1,200	CYR15
M23269/01-7012	3.9 2/		M23269/01-7081	68		M23269/03-7030	1,300	CYR20
M23269/01-7013	4.3 2/		M23269/01-7084	75		M23269/03-7033	1,500	
M23269/01-7015	4.7 2/		M23269/01-7087	82		M23269/03-7036	1,600	
M23269/01-7016	5.1 2/		M23269/01-7090	91		M23269/03-7039	1,800	
M23269/01-7018	5.6		M23269/01-7093	100		M23269/03-7042	2,000	
M23269/01-7020	6.2		M23269/01-7096	110		M23269/03-7045	2,200	
M23269/01-7022	6.8		M23269/01-7099	120		M23269/03-7048	2,400	
M23269/01-7024	7.5		M23269/01-7102	130		M23269/03-7051	2,700	
M23269/01-7026	8.2		M23269/01-7105	150		M23269/03-7054	3,000	
M23269/01-7028	9.1		M23269/01-7108	160		M23269/03-7057	3,300	
M23269/01-7030	10		M23269/01-7111	180		M23269/03-7060	3,600	
M23269/01-7032	11		M23269/01-7114	200		M23269/03-7063	3,900	
M23269/01-7034	12		M23269/01-7117	220		M23269/03-7066	4,300	
M23269/01-7036	13		M23269/01-7120	240		M23269/03-7069	4,700	
M23269/01-7038	15		M23269/01-7123	270		M23269/03-7072	5,100	CYR20
M23269/01-7040	16		M23269/01-7126	300	CYR10	M23269/04-7018	5,600	CYR30
M23269/01-7042	18		M23269/02-7015	330	CYR15	M23269/04-7021	6,200	
M23269/01-7044	20		M23269/02-7018	360		M23269/04-7024	6,800	
M23269/01-7046	22		M23269/02-7021	390		M23269/04-7027	7,500	
M23269/01-7048	24		M23269/02-7024	430		M23269/04-7030	8,200	
M23269/01-7051	27		M23269/02-7027	470		M23269/04-7033	9,100	
M23269/01-7054	30	CYR10	M23269/02-7030	510		M23269/04-7036	10,000	CYR30
			M23269/02-7033	560	CYR15			

1/ These are for 100 Volt, failure rate level "S" (0.001%/1,000 hours) and, except as noted, ±5% capacitance tolerance.

2/ The capacitance tolerance for these part numbers is ±0.25 pF.

3/ For case outlines and dimensions, see Figure 10-1.

Table 10-1b. Standard MIL-C-23269 Fixed, Glass Dielectric Capacitors

Part Number 1/	Capacitance (pF)	Style 3/	Part Number 1/	Capacitance (pF)	Style 3/	Part Number 1/	Capacitance (pF)	Style 3/
M23269/10-3001	1.0 2/	CYR51	M23269/10-3048	22	CYR51	M23269/10-3123	240	CYR51
M23269/10-3002	1.5 2/		M23269/10-3051	24		M23269/10-3126	270	
M23269/10-3003	2.2 2/		M23269/10-3054	27		M23269/10-3129	300	
M23269/10-3004	2.7 2/		M23269/10-3057	30		M23269/10-3132	330	
M23269/10-3005	3.0 2/		M23269/10-3060	33		M23269/10-3135	360	
M23269/10-3006	3.3 2/		M23269/10-3063	36		M23269/10-3138	390	
M23269/10-3007	3.6 2/		M23269/10-3066	39		M23269/10-3141	430	
M23269/10-3008	3.9 2/		M23269/10-3069	43		M23269/10-3144	470	
M23269/10-3009	4.3 2/		M23269/10-3072	47		M23269/10-3147	510	
M23269/10-3010	4.7 2/		M23269/10-3075	51		M23269/10-3150	560	CYR51
M23269/10-3012	5.1		M23269/10-3078	56		M23269/10-3203	620	CYR52
M23269/10-3014	5.6		M23269/10-3081	62		M23269/10-3206	680	
M23269/10-3016	6.2		M23269/10-3084	68		M23269/10-3209	750	
M23269/10-3018	6.8		M23269/10-3087	75		M23269/10-3212	820	
M23269/10-3020	7.5		M23269/10-3090	82		M23269/10-3215	910	
M23269/10-3022	8.2		M23269/10-3093	91		M23269/10-3218	1,000	CYR52
M23269/10-3024	9.1		M23269/10-3096	100		M23269/10-3303	1,100	CYR53
M23269/10-3026	10		M23269/10-3099	110		M23269/10-3306	1,200	
M23269/10-3028	11		M23269/10-3102	120		M23269/10-3309	1,300	
M23269/10-3030	12		M23269/10-3105	130		M23269/10-3312	1,500	
M23269/10-3033	13		M23269/10-3108	150		M23269/10-3315	1,600	
M23269/10-3036	15		M23269/10-3111	160		M23269/10-3318	1,800	
M23269/10-3039	16		M23269/10-3114	180		M23269/10-3321	2,000	
M23269/10-3042	18		M23269/10-3117	200		M23269/10-3324	2,200	
M23269/10-3045	20	CYR51	M23269/10-3120	220	CYR51	M23269/10-3327	2,400	CYR53

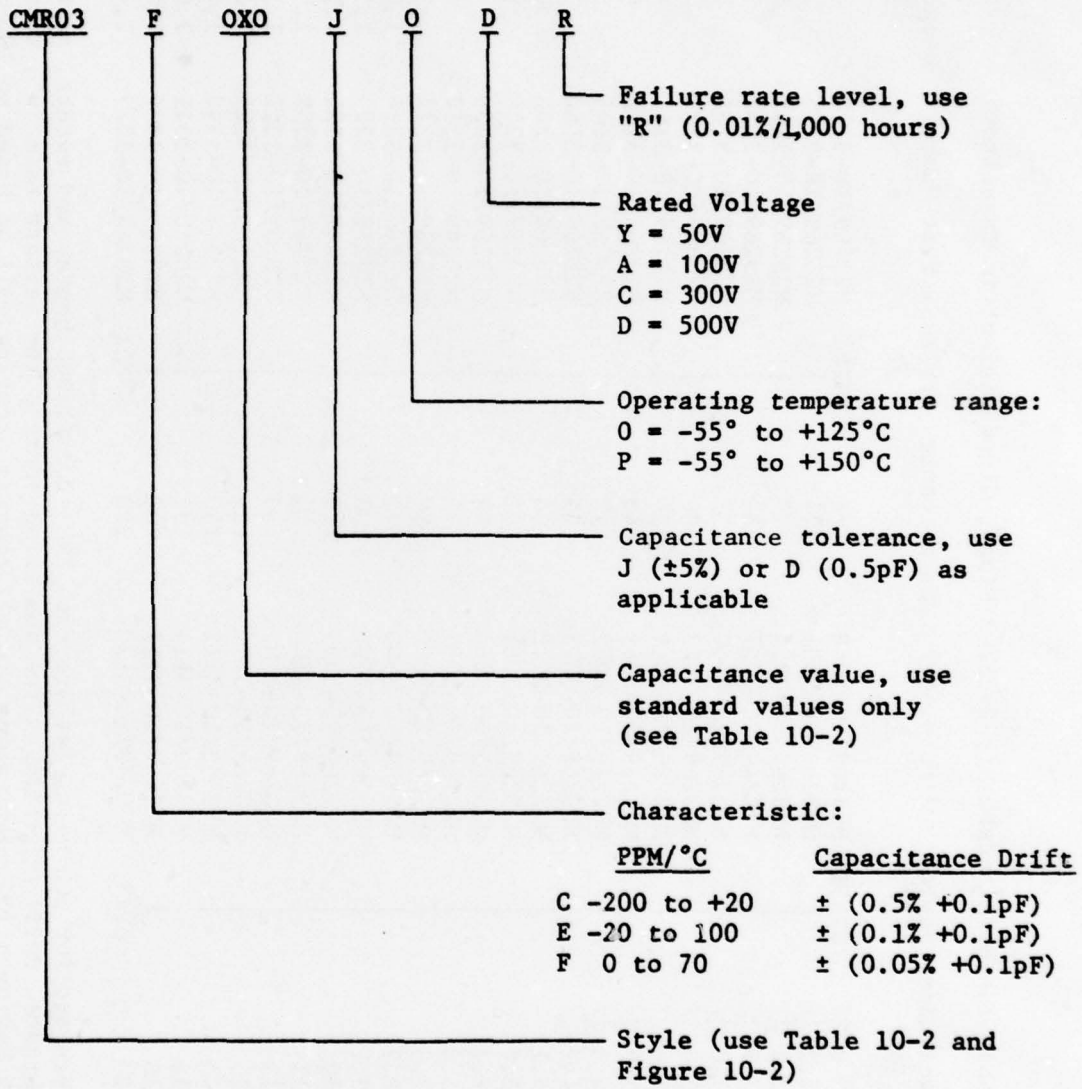
1/ These part numbers are for 300 volt, failure rate "M" (1.0%/1,000 hours) and except, as noted, ±5% capacitance tolerance. Until QPL-23269 lists qualified sources for failure rate "S", these devices will be considered as having a 100 volt rating and all program derating will be based on 100 volts.

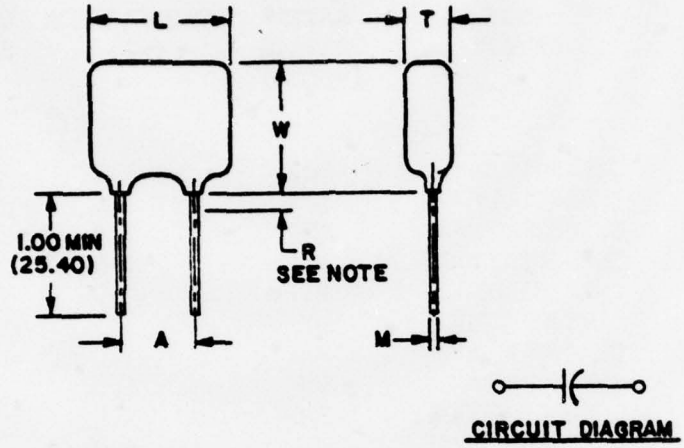
2/ The capacitance tolerance for these part numbers is ±0.25 pF.

3/ For case outlines and dimensions, see Figure 10-1.

10.2 Capacitors, fixed, mica dielectric (MIL-C-39001). The standard MIL-C-39001 fixed mica dielectric capacitors are listed in Table 10-2. Part sizes are shown in Figure 10-2.

10.2.1 Part number. The part number has the following form in accordance with MIL-C-39001/5:





NOTE: The "R" dimension may not be solderable as it may be covered by a clear epoxy or resinous coating.

Styles CMR03, CMR04, CMR05, CMR06, CMR07 and CMR08 Capacitors

DIMENSIONS (INCHES)

CASE SIZE	L Max	W Max	T Max	R Max	A ±.031	M ±.002
A	.270	.190 to .250	.110 to .190	.078	.120	.016
B	.360 to .390	.330 to .380	.190 to .220	.125	.150	.016
C	.450 to .470	.360 to .400	.170 to .220	.125	.225	.025
D	.640 to .700	.510 to .580	.200 to .350	.141	.350	.032
E	.780 to .830	.860 to .920	.280 to .450	.141	.425	.040
F	1.420 to 1.500	.880 to .940	.310 to .500	.141	1.050	.040

Figure 10-2. MIL-C-39001/5 Outline and Dimensions

(The above styles include 79 separate case sizes which increase slightly in size with capacitance.)

Table 10-2. Standard MIL-C-39001 Fixed, Mica Dielectric Capacitors

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (pF)	CASE SIZE
CMR03C1R0D0CR	300	1.0	A
CMR03C1R5D0CR	300	1.5	A
CMR03C2R0D0CR	300	2.0	A
CMR03C2R5D0CR	300	2.5	A
CMR03C3R0D0CR	300	3.0	A
CMR03C3R5D0CR	300	3.5	A
CMR03C4R0D0CR	300	4.0	A
CMR03C4R5D0CR	300	4.5	A
CMR03C5R0D0CR	300	5.0	A
CMR03C6R0D0CR	300	6.0	A
CMR03C7R0D0CR	300	7.0	A
CMR03C8R0D0CR	300	8.0	A
CMR03C9R0D0CR	300	9.0	A
CMR03C100D0CR	300	10	A
CMR03C110D0CR	300	11	A
CMR03C120D0CR	300	12	A
CMR03C150D0CR	300	15	A
CMR03C180D0CR	300	18	A
CMR03E200D0CR	300	20	A
CMR03E220D0CR	300	22	A
CMR03E240D0CR	300	24	A
CMR03E270J0CR	300	27	A
CMR03E300J0CR	300	30	A
CMR03E330J0CR	300	33	A
CMR03E360J0CR	300	36	A
CMR03E390J0CR	300	39	A
CMR03E430J0CR	300	43	A
CMR03E470J0CR	300	47	A
CMR03E510J0CR	300	51	A
CMR03E560J0CR	300	56	A
CMR03E620J0CR	300	62	A
CMR03E680J0CR	300	68	A
CMR03E750J0CR	300	75	A

1/ Tolerance for capacitance values 24pF and below is ± 0.5pF, all others have a capacitance tolerance of + 5%. All capacitors shown are failure rate level "R" (0.01%/1,000 hours).

Table 10-2. Standard MIL-C-39001 Fixed, Mica Dielectric Capacitors (Cont'd)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (pF)	CASE SIZE
CMR03E820JOCR	300	82	A
CMR03F910JOCR	300	91	A
CMR03F101JOCR	300	100	A
CMR03F111JOCR	300	110	A
CMR03F121JOCR	300	120	A
CMR03F131JOAR	100	130	A
CMR03F151JOAR	100	150	A
CMR03F161JOAR	100	160	A
CMR03F171JOAR	100	170	A
CMR03F181JOAR	100	180	A
CMR03F201JOAR	100	200	A
CMR03F221JOYR	50	220	A
CMR03F241JOYR	50	240	A
CMR03F271JOYR	50	270	A
CMR03F301JOYR	50	300	A
CMR03F331JOYR	50	330	A
CMR03F361JOYR	50	360	A
CMR03F391JOYR	50	390	A
CMR03F401JOYR	50	400	A

1/ Tolerance for capacitance values 24pF and below is ± 0.5pF, all others have a capacitance tolerance of + 5%. All capacitors shown are failure rate level "R" (0.01%/1,000 hours).

Table 10-2. Standard MIL-C-39001 Fixed, Mica Dielectric Capacitors (Cont'd)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (pF)	CASE SIZE
CMR04C1R0DPDR	500	1.0	B
CMR04C1R5DPDR	500	1.5	B
CMR04C2R0DPDR	500	2.0	B
CMR04C2R5DPDR	500	2.5	B
CMR04C3R0DPDR	500	3.0	B
CMR04C3R5DPDR	500	3.5	B
CMR04C4R0DPDR	500	4.0	B
CMR04C4R5DPDR	500	4.5	B
CMR04C5R0DPDR	500	5.0	B
CMR04C6R0DPDR	500	6.0	B
CMR04C7R0DPDR	500	7.0	B
CMR04C8R0DPDR	500	8.0	B
CMR04C9R0DPDR	500	9.0	B
CMR04C100DPDR	500	10	B
CMR04C110DPDR	500	11	B
CMR04C120JPDR	500	12	B
CMR04C150JPDR	500	15	B
CMR04C180JPDR	500	18	B
CMR04E200JPDR	500	20	B
CMR04E220JPDR	500	22	B
CRM04E240JPDR	500	24	B
CMR04E270JPDR	500	27	B
CMR04E300JPDR	500	30	B
CMR04E330JPDR	500	33	B
CMR04E360JPDR	500	36	B
CMR04E390JPDR	500	39	B
CMR04E430JPDR	500	43	B
CMR04E470JPDR	500	47	B
CMR04E510JPDR	500	51	B
CMR04E560JPDR	500	56	B
CMR04E620JPDR	500	62	B
CMR04E680JPDR	500	68	B
CMR04E750JPDR	500	75	B
CMR04E820JPDR	500	82	B
CMR04F910JPDR	500	91	B
CMR04F101JPDR	500	100	B
CMR04F111JPDR	500	110	B
CMR04F121JPDR	500	120	B
CMR04F131JPDR	500	130	B
CMR04F151JPDR	500	150	B
CMR04F161JPDR	500	160	B
CMR04F181JPDR	500	180	B
CMR04F201JPDR	500	200	B
CMR04F221JPDR	500	220	B
CMR04F241JPDR	500	240	B

1/ Tolerance for capacitance values of 11pF and below is ±0.5pF. All others have a capacitance value tolerance of ±5%. All capacitors shown are failure rate level "R" (0.01%/1,000 hours).

Table 10-2. Standard MIL-C-39001 Fixed, Mica Dielectric Capacitors (Cont'd)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (pF)	CASE SIZE
CMR05F271JPDR	500	270	C
CMR05F301JPDR	500	300	C
CMR05F331JPDR	500	330	C
CMR05F361JPDR	500	360	C
CMR05F391JPDR	500	390	C
CMR06F431JPDR	500	430	D
CMR06F471JPDR	500	470	D
CMR06F511JPDR	500	510	D
CMR06F561JPDR	500	560	D
CMR06F621JPDR	500	620	D
CMR06F681JPDR	500	680	D
CMR06F751JPDR	500	750	D
CMR06F821JPDR	500	820	D
CMR06F911JPDR	500	910	D
CMR06F102JPDR	500	1,000	D
CMR06F112JPDR	500	1,100	D
CMR06F122JPDR	500	1,200	D
CMR06F132JPDR	500	1,300	D
CMR06F152JPDR	500	1,500	D
CMR06F162JPDR	500	1,600	D
CMR06F182JPDR	500	1,800	D
CMR06F202JPDR	500	2,000	D
CMR06F222JPDR	500	2,200	D
CMR06F242JPDR	500	2,400	D
CMR06F272JPDR	500	2,700	D
CMR06F302JPDR	500	3,000	D
CMR06F332JPDR	500	3,300	D
CMR06F362JPDR	500	3,600	D
CMR06F392JPDR	500	3,900	D
CMR06F432JPDR	500	4,300	D
CMR06F472JPDR	500	4,700	D

1/ Tolerance for capacitance values of 11pF and below is ±0.5pF. All others have a capacitance value tolerance of ±5%. All capacitors shown are failure rate level "R" (0.01%/1,000 hours).

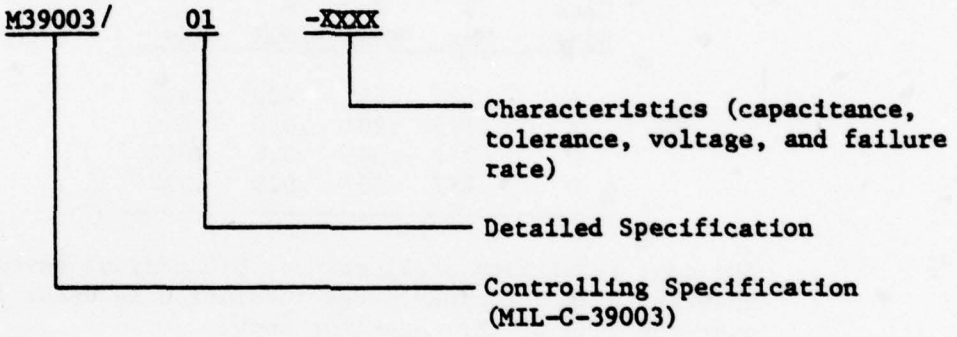
Table 10-2. Standard MIL-C-39001 Fixed, Mica Dielectric Capacitors (Cont'd)

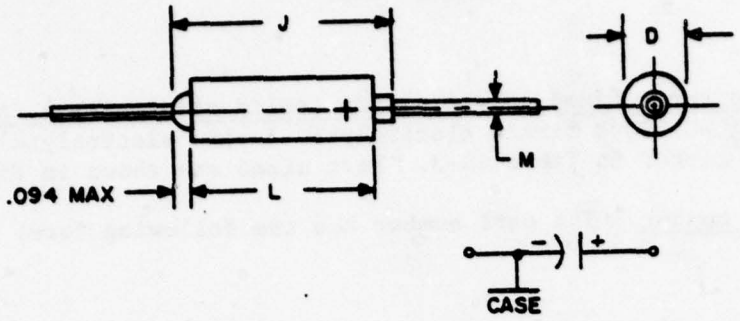
PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (pF)	CASE SIZE
CMR07F512JPDR	500	5,100	E
CMR07F562JPDR	500	5,600	E
CMR07F622JPDR	500	6,200	E
CMR07F682JPDR	500	6,800	E
CMR07F752JPDR	500	7,500	E
CMR07F822JPDR	500	8,200	E
CMR07F912JPDR	500	9,100	E
CMR07F103JPDR	500	10,000	E
CMR07F113JPDR	500	11,000	E
CMR07F123JPDR	500	12,000	E
CMR07F133JPDR	500	13,000	E
CMR07F153JPDR	500	15,000	E
CMR07F163JPDR	500	16,000	E
CMR07F183JPDR	500	17,000	E
CMR07F203JPDR	500	20,000	E
CMR08F223JPDR	500	22,000	F
CMR08F243JPDR	500	24,000	F
CMR08F273JPDR	500	27,000	F
CMR08F303JPDR	500	30,000	F
CMR08F333JPDR	500	33,000	F
CMR08F363JPDR	500	36,000	F
CMR08F393JPDR	500	39,000	F
CMR08F433JPDR	500	43,000	F
CMR08F473JPDR	500	47,000	F
CMR08F513JPDR	500	51,000	F
CMR08F563JPDR	300	56,000	F
CMR08F623JPDR	300	62,000	F
CMR08F683JPDR	300	68,000	F
CMR08F753JPDR	100	75,000	F
CMR08F823JPDR	100	82,000	F
CMR08F913JPDR	100	91,000	F

1/ Tolerance for capacitance values of 11pF and below is ±0.5pF. All others have a capacitance value tolerance of ±5%. All capacitors shown are failure rate level "R" (0.01%/1,000 hours).

10.3 Capacitors, fixed, electrolytic (solid electrolyte), tantalum. The standard MIL-C-39003 fixed, electrolytic (solid electrolyte) tantalum capacitors are listed in Table 10-3. Part sizes are shown in Figure 10-3.

10.3.1 Part number. The part number has the following form:

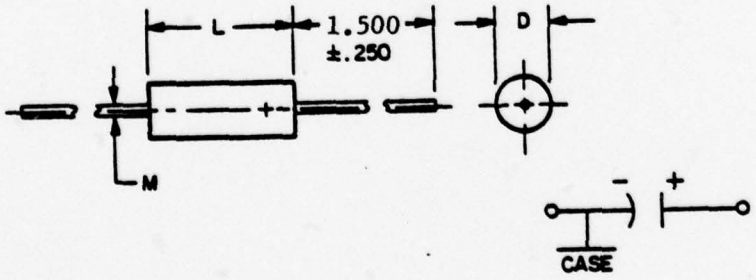




CIRCUIT DIAGRAM

Case Size	Dimensions (inches) L Max	D Max	M ±.002	J Max
A	.317	.151	.020	.422
B	.515	.201	.020	.610
C	.717	.305	.025	.822
D	.817	.367	.025	.922

The case insulation shall extend .015 minimum beyond each end. However, when a shrink-fitted insulation is used, it shall lap over the ends of the capacitor body.



Case Size	Dimensions (inches) L Max	D Max	M Max
A1	.281	.099	.021
B1	.405	.148	.021

Figure 10-3. MIL-C-39003 Outline and Dimensions

Table 10-3. Standard MIL-C-39003 Fixed, Electrolytic (Solid Electrolyte), Tantalum, Capacitors

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (μF)	CASE SIZE
M39003/01-2961	6	5.6	A
M39003/01-2962	6	6.8	A
M39003/01-2964	6	47.0	B
M39003/01-2966	6	56.0	B
M39003/01-2967	6	150.0	C
M39003/01-2969	6	180.0	C
M39003/01-2970	6	270.0	D
M39003/01-2971	6	330.0	D
M39003/01-2973	10	3.9	A
M39003/01-2974	10	4.7	A
M39003/01-2976	10	27.0	B
M39003/01-2977	10	33.0	B
M39003/01-2979	10	39.0	B
M39003/01-2980	10	82.0	C
M39003/01-2981	10	100.0	C
M39003/01-2983	10	120.0	C
M39003/01-2984	10	180.0	D
M39003/01-2985	10	222.0	D
M39003/01-2987	15	2.7	A
M39003/01-2988	15	3.3	A
M39003/01-2990	15	18.0	B
M39003/01-2991	15	22.0	B
M39003/01-2993	15	56.0	C
M39003/01-2994	15	68.0	C
M39003/01-2996	15	120.0	D
M39003/01-2997	15	150.0	D
M39003/01-2999	20	1.2	A
M39003/01-3000	20	1.5	A
M39003/01-3002	20	1.8	A
M39003/01-3003	20	2.2	A
M39003/01-3005	20	8.2	B
M39003/01-3006	20	10.0	B
M39003/01-3008	20	12.0	B
M39003/01-3009	20	15.0	B
M39003/01-3011	20	27.0	C
M39003/01-3012	20	33.0	C
M39003/01-3014	20	39.0	C
M39003/01-3015	20	47.0	C
M39003/01-3017	20	56.0	D
M39003/01-3018	20	68.0	D

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "S" (0.001%/1,000 hours).

Table 10-3. Standard MIL-C-39003 Fixed, Electrolytic (Solid Electrolyte), Tantalum, Capacitors (Continued)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (μF)	CASE SIZE
M39003/01-3020	20	82.0	D
M39003/01-3021	20	100.0	D
M39003/01-3023	35	5.6	B
M39003/01-3024	35	6.8	B
M39003/01-3026	35	22.0	C
M39003/01-3028	35	27.0	D
M39003/01-3029	35	33.0	D
M39003/01-3031	35	39.0	D
M39003/01-3032	35	47.0	D
M39003/01-3034	50	.0047	A
M39003/01-3036	50	.0056	A
M39003/01-3037	50	.0068	A
M39003/01-3039	50	.0082	A
M39003/01-3040	50	.010	A
M39003/01-3042	50	.012	A
M39003/01-3043	50	.015	A
M39003/01-3045	50	.018	A
M39003/01-3046	50	.022	A
M39003/01-3048	50	.027	A
M39003/01-3049	50	.033	A
M39003/01-3051	50	.039	A
M39003/01-3052	50	.047	A
M39003/01-3054	50	.056	A
M39003/01-3055	50	.068	A
M39003/01-3057	50	.082	A
M39003/01-3058	50	.10	A
M39003/01-3060	50	.12	A
M39003/01-3061	50	.15	A
M39003/01-3063	50	.18	A
M39003/01-3064	50	.22	A
M39003/01-3066	50	.27	A
M39003/01-3067	50	.33	A
M39003/01-3069	50	.39	A
M39003/01-3070	50	.47	A
M39003/01-3072	50	.56	A
M39003/01-3073	50	.68	A
M39003/01-3075	50	.82	A
M39003/01-3076	50	1.0	A
M39003/01-3078	50	1.2	B
M39003/01-3079	50	1.5	B

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "S" (0.001%/1,000 hours).

Table 10-3. Standard MIL-C-39003 Fixed, Electrolytic (Solid Electrolyte), Tantalum, Capacitors (Continued)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (μF)	CASE SIZE
M39003/01-3081	50	1.8	B
M39003/01-3082	50	2.2	B
M39003/01-3084	50	2.7	B
M39003/01-3085	50	3.3	B
M39003/01-3087	50	3.9	B
M39003/01-3088	50	4.7	B
M39003/01-3090	50	5.6	C
M39003/01-3091	50	6.8	C
M39003/01-3093	50	8.2	C
M39003/01-3094	50	10.0	C
M39003/01-3096	50	12.0	C
M39003/01-3097	50	15.0	C
M39003/01-3099	50	18.0	C
M39003/01-3100	50	22.0	D
M39003/01-3102	75	.1	A
M39003/01-3104	75	.12	A
M39003/01-3105	75	.15	A
M39003/01-3107	75	.18	A
M39003/01-3108	75	.22	A
M39003/01-3110	75	.27	A
M39003/01-3111	75	.33	A
M39003/01-3113	75	.39	A
M39003/01-3114	75	.47	A
M39003/01-3116	75	.56	A
M39003/01-3117	75	.68	A
M39003/01-3119	75	.82	B
M39003/01-3120	75	1.0	B
M39003/01-3122	75	1.2	B
M39003/01-3123	75	1.5	B
M39003/01-3125	75	1.8	B
M39003/01-3126	75	2.2	B
M39003/01-3128	75	2.7	B
M39003/01-3129	75	3.3	B
M39003/01-3131	75	3.9	B
M39003/01-3132	75	4.7	C
M39003/01-3134	75	5.6	C
M39003/01-3135	75	6.8	C
M39003/01-3137	75	8.2	C
M39003/01-3138	75	10.0	C

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "S" (0.001%/1,000 hours).

Table 10-3. Standard MIL-C-39003 Fixed, Electrolytic (Solid Electrolyte), Tantalum, Capacitors (Continued)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (μF)	CASE SIZE
M39003/01-3140	75	12.0	C
M39003/01-3141	75	15.0	D
M39003/01-3143	100	.0047	A
M39003/01-3145	100	.0056	A
M39003/01-3146	100	.0068	A
M39003/01-3148	100	.0082	A
M39003/01-3149	100	.010	A
M39003/01-3151	100	.012	A
M39003/01-3152	100	.015	A
M39003/01-3154	100	.018	A
M39003/01-3155	100	.022	A
M39003/01-3157	100	.027	A
M39003/01-3158	100	.033	A
M39003/01-3160	100	.039	A
M39003/01-3161	100	.047	A
M39003/01-3163	100	.056	A
M39003/01-3164	100	.068	A
M39003/01-3166	100	.082	A
M39003/01-3167	100	.082	A
M39003/01-3169	100	.12	A
M39003/01-3170	100	.15	A
M39003/01-3172	100	.18	A
M39003/01-3173	100	.22	A
M39003/01-3175	100	.27	A
M39003/01-3176	100	.33	A
M39003/01-3178	100	.39	A
M39003/01-3179	100	.47	A
M39003/01-3181	100	.56	A
M39003/01-3182	100	.68	B
M39003/01-3184	100	.82	B
M39003/01-3185	100	1.0	B
M39003/01-3187	100	1.2	B
M39003/01-3188	100	1.5	B
M39003/01-3190	100	1.8	B
M39003/01-3191	100	2.2	B
M39003/01-3193	100	2.7	B
M39003/01-5757	100	3.3	C
M39003/01-5760	100	3.9	C
M39003/01-5762	100	4.7	C
M39003/01-5765	100	5.6	C
M39003/01-5767	100	6.8	C

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "S" (0.001%/1,000 hours).

Table 10-3. Standard MIL-C-39003 Fixed, Electrolytic (Solid Electrolyte), Tantalum, Capacitors (Continued)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (μF)	CASE SIZE
M39003/02-0181	6	2.7	A1
M39003/02-0182	6	18.0	B1
M39003/02-0187	10	1.8	A1
M39003/02-0188	10	2.2	A1
M39003/02-0189	10	10.0	B1
M39003/02-0190	10	12.0	B1
M39003/02-0191	10	15.0	B1
M39003/02-0192	15	1.0	A1
M39003/02-0193	15	1.2	A1
M39003/02-0194	15	1.5	A1
M39003/02-0195	15	8.2	B1
M39003/02-0196	20	.56	A1
M39003/02-0197	20	.68	A1
M39003/02-0198	20	.82	A1
M39003/02-0199	20	1.0	A1
M39003/02-0200	20	3.3	B1
M39003/02-0201	20	3.9	B1
M39003/02-0202	20	4.7	B1
M39003/02-0203	20	5.6	B1
M39003/02-0204	20	6.8	B1
M39003/02-0205	35	.33	A1
M39003/02-0206	35	.39	A1
M39003/02-0207	35	.47	A1
M39003/02-0208	35	2.2	B1
M39003/02-0209	35	2.7	B1
M39003/02-0210	50	.22	A1
M39003/02-0211	50	.27	A1
M39003/02-0212	50	1.5	B1
M39003/02-0213	50	1.8	B1
M39003/02-0214	75	.047	A1
M39003/02-0215	75	.056	A1
M39003/02-0216	75	.068	A1
M39003/02-0217	75	.082	A1
M39003/02-0218	75	.10	A1
M39003/02-0219	75	.12	A1
M39003/02-0220	75	.15	A1
M39003/02-0221	75	.18	A1
M39003/02-0222	75	.22	B1
M39003/02-0223	75	.27	B1
M39003/02-0224	75	.33	B1
M39003/02-0225	75	.39	B1
M39003/02-0226	75	.47	B1
M39003/02-0227	75	.56	B1
M39003/02-0228	75	.68	B1
M39003/02-0229	75	.82	B1
M39003/02-0230	75	1.0	B1
M39003/02-0231	75	1.2	B1

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "S" (0.001%/1,000 hours).

Table 10-3. Standard MIL-C-39003 Fixed, Electrolytic (Solid Electrolyte), Tantalum, Capacitors (Continued)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (μF)	CASE SIZE
M39003/03-0401	6	10.0	A
M39003/03-0403	6	12.0	A
M39003/03-0404	6	100.0	B
M39003/03-0406	6	330.0	C
M39003/03-0408	6	390.0	C
M39003/03-0409	6	470.0	C
M39003/03-0411	6	680.0	D
M39003/03-0413	6	820.0	D
M39003/03-0414	6	1000.0	D
M39003/03-0416	10	6.8	A
M39003/03-0418	10	8.2	A
M39003/03-0419	10	47.0	B
M39003/03-0421	10	56.0	B
M39003/03-0422	10	68.0	B
M39003/03-0424	10	82.0	B
M39003/03-0425	10	220.0	C
M39003/03-0427	10	270.0	C
M39003/03-0428	10	390.0	C
M39003/03-0429	10	470.0	D
M39003/03-0431	10	560.0	D
M39003/03-0432	15	4.7	A
M39003/03-0434	15	5.6	A
M39003/03-0435	15	33.0	B
M39003/03-0437	15	39.0	B
M39003/03-0438	15	150.0	C
M39003/03-0440	15	180.0	C
M39003/03-0441	15	220.0	D
M39003/03-0443	15	270.0	D
M39003/03-0444	15	330.0	D

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "S" (0.001%/1,000 hours).

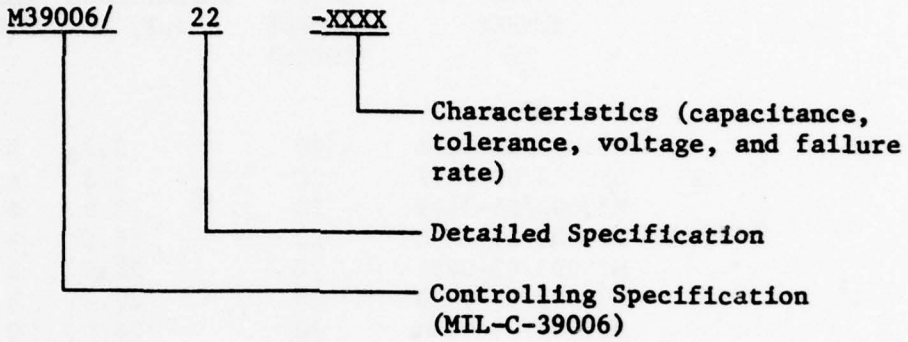
Table 10-3. Standard MIL-C-39003 Fixed, Electrolytic (Solid Electrolyte), Tantalum, Capacitors (Continued)

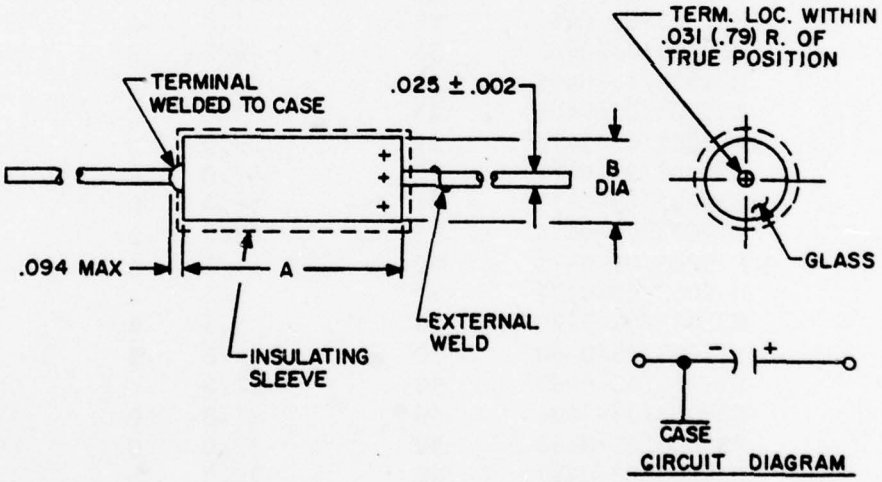
PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (μF)	CASE SIZE
M39003/03-0446	20	2.7	A
M39003/03-0447	20	3.3	A
M39003/03-0449	20	3.9	A
M39003/03-0450	20	18.0	B
M39003/03-0451	20	22.0	B
M39003/03-0453	20	27.0	B
M39003/03-0454	20	56.0	C
M39003/03-0455	20	68.0	C
M39003/03-0457	20	82.0	C
M39003/03-0458	20	100.0	C
M39003/03-0460	20	120.0	C
M39003/03-0461	20	150.0	D
M39003/03-0463	20	180.0	D
M39003/03-0464	35	1.8	A
M39003/03-0465	35	8.2	B
M39003/03-0466	35	10.0	B
M39003/03-0468	35	33.0	C
M39003/03-0470	35	39.0	C
M39003/03-0471	35	47.0	C
M39003/03-0473	35	56.0	D
M39003/03-0474	35	68.0	D
M39003/03-0476	50	1.2	A
M39003/03-0477	50	1.5	A
M39003/03-0479	50	5.6	B
M39003/03-0480	50	6.8	B
M39003/03-0482	50	22.0	C
M39003/03-0484	50	27.0	C
M39003/03-0485	50	33.0	D
M39003/03-0487	50	39.0	D

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "S" (0.001%/1,000 hours).

10.4 Capacitors, fixed, electrolytic (nonsolid electrolyte), tantalum. The standard MIL-C-39006 fixed, electrolytic (nonsolid), tantalum capacitors are listed in Table 10-4. Part sizes are shown in Figure 10-4.

10.4.1 Part number. The part number has the following form:





Case Size	Dimensions (inches)		
	A Max	B Max (basic case)	B Max (insulated case)
T1	.484	.204	.219
T2	.672	.297	.312
T3	.797	.391	.406

Figure 10-4. MIL-C-39006/22, Style CLR79 Outline and Dimensions

27

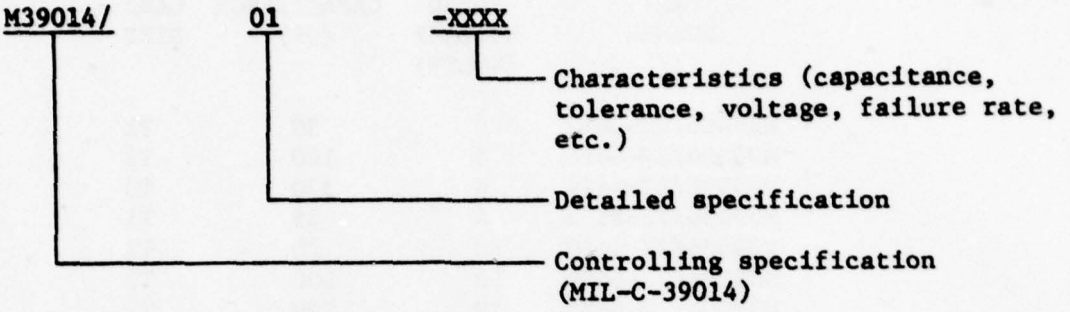
Table 10-4. Standard MIL-C-39006 Fixed, Electrolytic (Nonsolid Electrolyte), Tantalum, Capacitors

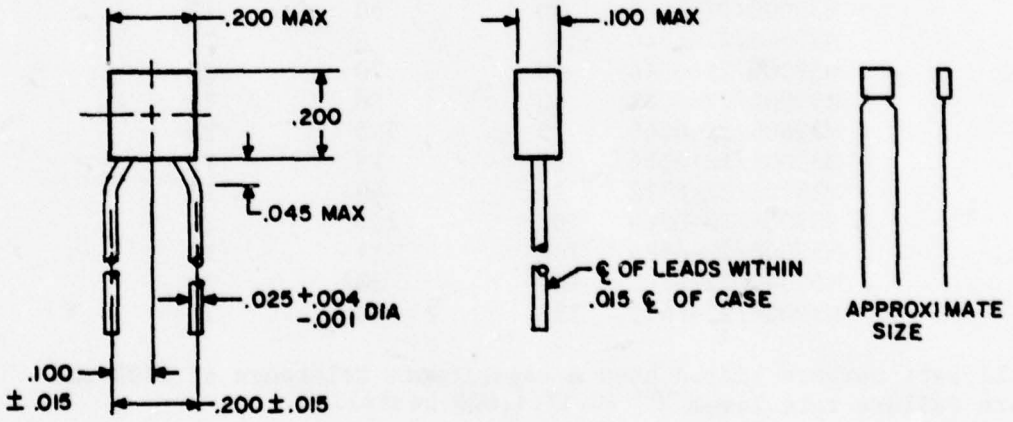
PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (μF)	CASE SIZE
M39006/22-6412	6	30	T1
M39006/22-6418	6	140	T2
M39006/22-6424	6	330	T3
M39006/22-6432	8	25	T1
M39006/22-6440	10	20	T1
M39006/22-6452	10	100	T2
M39006/22-6458	10	250	T3
M39006/22-6466	15	15	T1
M39006/22-6472	15	70	T2
M39006/22-6478	15	170	T3
M39006/22-6486	25	10	T1
M39006/22-6500	30	8	T1
M39006/22-6506	30	40	T2
M39006/22-6512	30	100	T3
M39006/22-6520	50	5	T1
M39006/22-6526	50	25	T2
M39006/22-6532	50	60	T3
M39006/22-6540	60	4	T1
M39006/22-6546	60	20	T2
M39006/22-6552	60	50	T3
M39006/22-6560	75	3.5	T1
M39006/22-6566	75	15	T2
M39006/22-6572	75	40	T3
M39006/22-6580	100	2.5	T1
M39006/22-6586	100	11	T2
M39006/22-6592	100	30	T3
M39006/22-6612	125	18	T3

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "P" (0.1%/1,000 hours).

10.5 Capacitors, fixed, ceramic dielectric (MIL-C-39014). The standard MIL-C-39014 fixed, ceramic dielectric capacitors are listed in Table 10.5. Part sizes are shown in Figure 10.5.

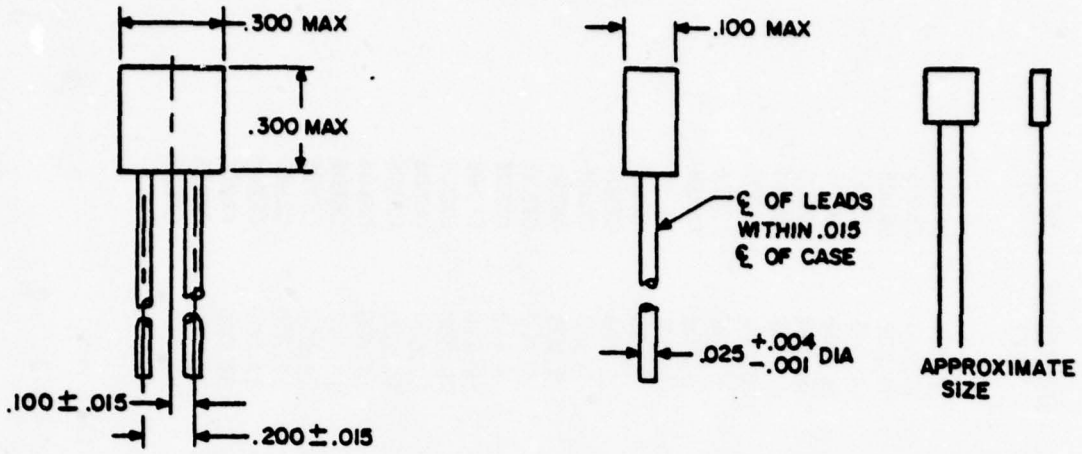
10.5.1 Part number. The part number has the following form:



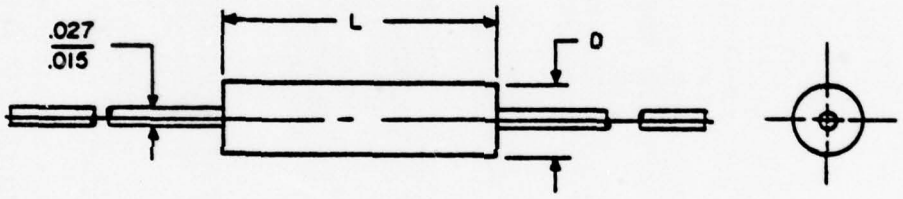


A. Style CKR05

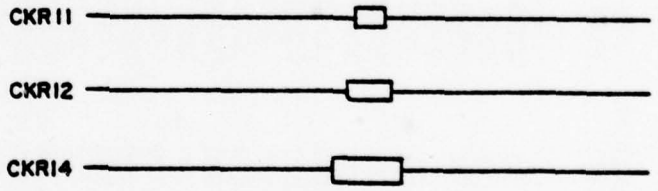
Figure 10.5. MIL-C-39014 Outline and Dimensions



B. Style CKR06



Style	Dimensions (inches) L(Max)	D(Max)
CKR11	.170	.100
CKR12	.260	.100
CKR14	.400	.150



APPROXIMATE SIZE

C. Styles CKR11, CKR12, CKR14

Figure 10-5. MIL-C-39014 Outline and Dimensions (Continued)

Table 10.5. Standard MIL-C-39014 Fixed, Ceramic Dielectric Capacitors

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (pF)	CASE SIZE
M39014/01-1241	200	10	CKR05
M39014/01-1244	200	15	CKR05
M39014/01-1247	200	22	CKR05
M39014/01-1250	200	33	CKR05
M39014/01-1253	200	47	CKR05
M39014/01-1256	200	68	CKR05
M39014/01-1259	200	100	CKR05
M39014/01-1262	200	150	CKR05
M39014/01-1265	200	220	CKR05
M39014/01-1268	200	330	CKR05
M39014/01-1271	200	470	CKR05
M39014/01-1274	200	680	CKR05
M39014/01-1277	200	1,000	CKR05
M39014/01-1279	100	1,200	CKR05
M39014/01-1280	100	1,500	CKR05
M39014/01-1482	100	1,800	CKR05
M39014/01-1483	100	2,200	CKR05
M39014/01-1485	100	2,700	CKR05
M39014/01-1486	100	3,300	CKR05
M39014/01-1488	100	3,900	CKR05
M39014/01-1489	100	4,700	CKR05
M39014/01-1491	100	5,600	CKR05
M39014/01-1492	100	6,800	CKR05
M39014/01-1494	100	8,200	CKR05
M39014/01-1495	100	10,000	CKR05
M39014/01-1497	50	12,000	CKR05
M39014/01-1498	50	15,000	CKR05
M39014/01-1500	50	18,000	CKR05
M39014/01-1501	50	22,000	CKR05
M39014/01-1503	50	27,000	CKR05
M39014/01-1504	50	33,000	CKR05
M39014/01-1506	50	39,000	CKR05
M39014/01-1507	50	47,000	CKR05
M39014/01-1509	50	56,000	CKR05
M39014/01-1510	50	68,000	CKR05
M39014/01-1512	50	82,000	CKR05
M39014/01-1513	50	100,000	CKR05
M39014/02-1241	200	1,200	CKR06
M39014/02-1242	200	1,500	CKR06
M39014/02-1244	200	1,800	CKR06
M39014/02-1246	200	2,200	CKR06
M39014/02-1248	200	2,700	CKR06
M39014/02-1249	200	3,300	CKR06
M39014/02-1251	200	3,900	CKR06
M39014/02-1252	200	4,700	CKR06
M39014/02-1254	200	5,600	CKR06
M39014/02-1255	200	6,800	CKR06
M39014/02-1257	200	8,200	CKR06
M39014/02-1258	200	10,000	CKR06
M39014/02-1271	100	12,000	CKR06
M39014/02-1260	100	15,000	CKR06
M39014/02-1261	100	18,000	CKR06
M39014/02-1262	100	22,000	CKR06
M39014/02-1272	100	27,000	CKR06
M39014/02-1263	100	33,000	CKR06
M39014/02-1264	100	39,000	CKR06
M39014/02-1265	100	47,000	CKR06
M39014/02-1266	100	56,000	CKR06

1/ All part numbers listed have a capacitance tolerance of ±10% and are failure rate level "P" (0.1%/1,000 hours).

Table 10.5. Standard MIL-C-39014 Fixed, Ceramic Dielectric Capacitors (Cont'd)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (pF)	CASE SIZE
M39014/02-1267	100	68,000	CKR06
M39014/02-1269	100	82,000	CKR06
M39014/02-1270	100	100,000	CKR06
M39014/02-1273	50	120,000	CKR06
M39014/02-1274	50	150,000	CKR06
M39014/02-1275	50	180,000	CKR06
M39014/02-1276	50	220,000	CKR06
M39014/02-1277	50	270,000	CKR06
M39014/02-1278	50	330,000	CKR06
M39014/02-1279	50	390,000	CKR06
M39014/02-1280	50	470,000	CKR06
M39014/02-1408	50	560,000	CKR06
M39014/02-1409	50	680,000	CKR06
M39014/02-1410	50	820,000	CKR06
M39014/02-1411	50	1,000,000	CKR06
M39014/05-2801	100	10	CKR11
M39014/05-2803	100	12	CKR11
M39014/05-2804	100	15	CKR11
M39014/05-2806	100	18	CKR11
M39014/05-2807	100	22	CKR11
M39014/05-2809	100	27	CKR11
M39014/05-2810	100	33	CKR11
M39014/05-2812	100	39	CKR11
M39014/05-2813	100	47	CKR11
M39014/05-2815	100	56	CKR11
M39014/05-2816	100	68	CKR11
M39014/05-2818	100	82	CKR11
M39014/05-2819	100	100	CKR11
M39014/05-2821	100	120	CKR11
M39014/05-2822	100	150	CKR11
M39014/05-2824	100	180	CKR11
M39014/05-2825	100	220	CKR11
M39014/05-2827	100	270	CKR11
M39014/05-2828	100	330	CKR11
M39014/05-2830	100	390	CKR11
M39014/05-2831	100	470	CKR11
M39014/05-2833	100	560	CKR11
M39014/05-2834	100	680	CKR11
M39014/05-2836	100	820	CKR11
M39014/05-2837	100	1,000	CKR11
M39014/05-2839	100	1,200	CKR11
M39014/05-2840	100	1,500	CKR11
M39014/05-2842	100	1,800	CKR11
M39014/05-2843	100	2,200	CKR11
M39014/05-2845	100	2,700	CKR11
M39014/05-2846	100	3,300	CKR11
M39014/05-2848	100	3,900	CKR11
M39014/05-2849	100	4,700	CKR11
M39014/05-2851	50	5,600	CKR11
M39014/05-2852	50	6,800	CKR11
M39014/05-2854	50	8,200	CKR11
M39014/05-2855	50	10,000	CKR11
M39014/05-2857	100	5,600	CKR12
M39014/05-2858	100	6,800	CKR12
M39014/05-2860	100	8,200	CKR12
M39014/05-2861	100	10,000	CKR12

1/ All part numbers have a capacitance tolerance of ±10% and are failure rate level "P" (0.1%/1,000 hours).

Table 10-5. Standard MIL-C-39014 Fixed, Ceramic Dielectric Capacitors (Cont'd)

PART NUMBER 1/	DC RATED VOLTAGE (VOLTS)	CAPACITANCE (pF)	CASE SIZE
M39014/05-2863	50	12,000	CKR12
M39014/05-2964	50	15,000	CKR12
M39014/05-2866	50	18,000	CKR12
M39014/05-2867	50	22,000	CKR12
M39014/05-2869	50	27,000	CKR12
M39014/05-2870	50	33,000	CKR12
M39014/05-2872	50	39,000	CKR12
M39014/05-2873	50	47,000	CKR12
M39014/05-2875	100	12,000	CKR14
M39014/05-2876	100	15,000	CKR14
M39014/05-2878	100	18,000	CKR14
M39014/05-2879	100	22,000	CKR14
M39014/05-2881	100	27,000	CKR14
M39014/05-2882	100	33,000	CKR14
M39014/05-2884	100	39,000	CKR14
M39014/05-2885	100	47,000	CKR14
M39014/05-2887	50	56,000	CKR14
M39014/05-2888	50	68,000	CKR14
M39014/05-2890	50	82,000	CKR14
M39014/05-2891	50	100,000	CKR14
M39014/05-2899	50	120,000	CKR14
M39014/05-2900	50	150,000	CKR14
M39014/05-2902	50	180,000	CKR14
M39014/05-2903	50	220,000	CKR14
M39014/05-2905	50	270,000	CKR14

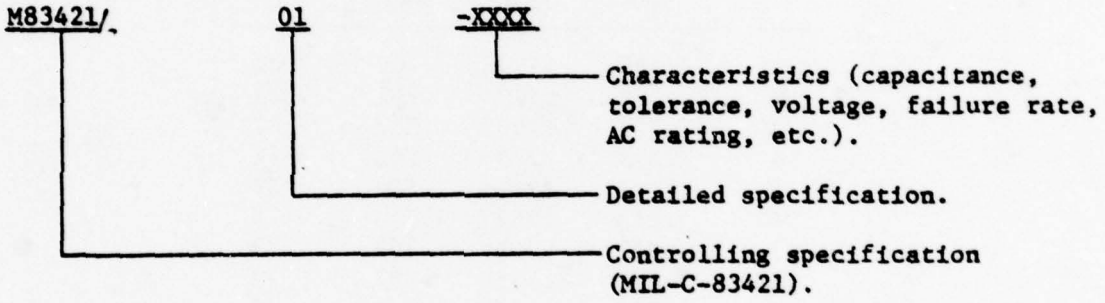
1/ All part numbers have a capacitance tolerance of ±10% and are failure rate level "P" (0.1%/1,000 hours).

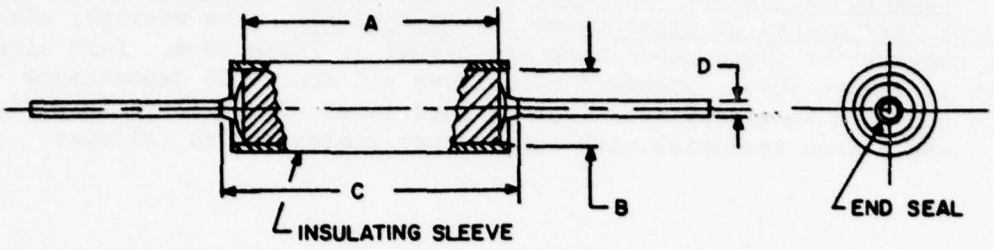
10.6 Capacitors, fixed, supermetalized plastic film dielectric, dc and ac, hermetically sealed in metal cases (MIL-C-83421/1). The ratings, sizes and part numbers for these capacitors are listed in Table 10-6. Part sizes are shown in Figure 10-6. Standard capacitors all are ±5.0% capacitance tolerance and have an established failure rate level "P" (0.1% failures/1,000 hours). Capacitance variation with temperature limits are as follows:

Capacitance Variation	Temperature Limits
-1.5 to -2.5%	25° to -65°
+0.8 to -0.5%	25° to 125°

Drift from above exposures ±0.1% maximum.

10.6.1 Part number. The part number has the following form:





Insulating sleeve shall extend beyond the capacitor body. Insulating sleeve thickness shall not exceed .005 inch.

Plastic insulating sleeve shall be transparent; marking shall be applied to the capacitor case.

Case	Dimensions (inches)			
	A Max	B Max	C Max	D*
1	.530	.190	.700	22
2	.592	.190	.762	22
3	.717	.190	.887	22
4	.592	.213	.762	22
5	.717	.213	.887	22
6	.843	.213	1.013	22
7	.592	.255	.762	22
8	.717	.255	.887	22
9	.843	.255	1.013	22
10	.717	.332	.887	22
11	.843	.332	1.013	22
12	1.093	.332	1.263	22
13	.843	.420	1.013	20
14	1.083	.420	1.263	20
15	1.405	.420	1.575	20
16	1.155	.520	1.325	20
17	1.405	.520	1.575	20
18	1.155	.582	1.325	18
19	1.405	.582	1.575	18
20	1.905	.582	1.575	18
21	1.405	.690	1.575	18
22	1.954	.690	2.075	18
23	1.905	.770	2.075	18
24	1.905	1.020	2.075	18
25	2.405	1.020	2.575	18

* AWG wire size.

Figure 10-6. MIL-C-83421/1 Outline and Dimensions

Table 10-6. Capacitors, Fixed, Supermetalized Plastic Film Dielectric, dc and ac, Hermetically Sealed in Metal Cases

PART NUMBER	CAPACITANCE (μf)	DC RATED VOLTAGE (VOLTS)	AC VOLTS AT 4KHz	AC VOLTS AT 40KHz	VRMS	CASE SIZE
M83421/1-1005P	.001	30	22	22	22	1
M83421/1-1011P	.0012	30	22	22	22	1
M83421/1-1017P	.0015	30	22	22	22	1
M83421/1-1023P	.0018	30	22	22	22	1
M83421/1-1035P	.0022	30	22	22	22	1
M83421/1-1041P	.0027	30	22	22	22	1
M83421/1-1047P	.0033	30	22	22	22	1
M83421/1-1053P	.0039	30	22	22	22	1
M83421/1-1059P	.0047	30	22	22	22	1
M83421/1-1071P	.0056	30	22	22	22	1
M83421/1-1077P	.0068	30	22	22	22	1
M83421/1-1083P	.0082	30	22	22	22	1
M83421/1-1089P	.01	30	22	22	22	1
M83421/1-1095P	.012	30	22	22	22	1
M83421/1-1101P	.015	30	22	22	22	1
M83421/1-1107P	.018	30	22	22	22	1
M83421/1-1119P	.022	30	22	22	22	1
M83421/1-1125P	.027	30	22	22	22	2
M83421/1-1131P	.033	30	22	22	22	2
M83421/1-1137P	.039	30	22	22	22	2
M83421/1-1143P	.047	30	22	22	22	2
M83421/1-1155P	.056	30	22	22	22	2
M83421/1-1161P	.068	30	22	22	22	3
M83421/1-1167P	.082	30	22	22	22	3
M83421/1-1173P	.10	30	22	22	22	5
M83421/1-1179P	.12	30	22	22	22	5
M83421/1-1185P	.15	30	22	22	22	7
M83421/1-1377P	.18	30	22	22	22	8
M83421/1-1197P	.22	30	22	18.5	22	8
M83421/1-1203P	.27	30	22	17	22	8
M83421/1-1209P	.33	30	22	16	22	8
M83421/1-1215P	.39	30	22	15	22	8
M83421/1-1221P	.47	30	22	14	22	10
M83421/1-1233P	.56	30	22	12.9	22	10
M83421/1-1239P	.68	30	22	12	22	10
M83421/1-1245P	.82	30	22	10	22	11
M84321/1-1251P	1.0	30	22	8.4	22	11
M84321/1-1257P	1.2	30	22	7.2	22	11
M83421/1-1263P	1.5	30	22	5.8	22	13
M83421/1-1269P	1.8	30	22	4.8	22	13
M83421/1-1281P	2.2	30	22	4.0	22	13

Table 10-6. Capacitors, Fixed, Supermetalized Plastic Film Dielectric, dc and ac, Hermetically Sealed in Metal Cases (Continued)

PART NUMBER	CAPACITANCE (μf)	DC RATED VOLTAGE (VOLTS)	AC VOLTS AT 4KHz	AC VOLTS AT 40KHz	VRMS	CASE SIZE
M83421/1-1287P	2.7	30	22	3.3	22	13
M83421/1-1299P	3.3	30	22	2.7	22	14
M83421/1-1305P	3.9	30	22	2.3	22	15
M83421/1-1317P	4.7	30	18.7	1.9	22	17
M83421/1-1329P	5.6	30	15.7	1.6	22	17
M83421/1-1335P	6.8	30	13	1.3	22	19
M83421/1-1347P	8.2	30	10.7	1.1	22	19
M83421/1-1353P	10	30	8.8	.88	22	19
M83421/1-1383P	12	30	7.3	.73	22	20
M83421/1-1359P	15	30	5.9	.59	22	20
M83421/1-1371P	22	30	4	.4	22	22
M83421/1-2005P	.001	50	36	36	36	1
M83421/1-2011P	.0012	50	36	36	36	1
M83421/1-2017P	.0015	50	36	36	36	1
M83421/1-2023P	.0018	50	36	36	36	1
M83421/1-2035P	.0022	50	36	36	36	1
M83421/1-2041P	.0027	50	36	36	36	1
M83421/1-2047P	.0033	50	36	36	36	1
M83421/1-2053P	.0039	50	36	36	36	1
M83421/1-2059P	.0047	50	36	36	36	1
M83421/1-2071P	.0056	50	36	36	36	1
M83421/1-2077P	.0068	50	36	36	36	1
M83421/1-2083P	.0082	50	36	36	36	2
M83421/1-2089P	.01	50	36	36	36	2
M83421/1-2095P	.012	50	36	36	36	2
M83421/1-2101P	.015	50	36	36	36	2
M83421/1-2107P	.018	50	36	36	36	4
M83421/1-2119P	.022	50	36	36	36	4
M83421/1-2125P	.027	50	36	36	36	4
M83421/1-2131P	.033	50	36	36	36	4
M83421/1-2137P	.039	50	36	36	36	3
M83421/1-2143P	.047	50	36	36	36	3
M83421/1-2155P	.056	50	36	36	36	5
M83421/1-2161P	.068	50	36	34	36	5
M83421/1-2167P	.082	50	36	32	36	6
M83421/1-2173P	.10	50	36	30	36	6
M83421/1-2179P	.12	50	36	30	36	8
M83421/1-2185P	.15	50	36	26	36	8
M83421/1-2191P	.18	50	36	25	36	9
M83421/1-2203P	.22	50	36	23	36	9
M83421/1-2209P	.27	50	36	19	36	10
M83421/1-2214P	.33	50	36	18	36	10
M83421/1-2221P	.39	50	36	17	36	11
M83421/1-2227P	.47	50	36	15.7	36	11

Table 10-6. Capacitors, Fixed, Supermetalized Plastic Film Dielectric, dc and ac, Hermetically Sealed in Metal Cases (Continued)

PART NUMBER	CAPACITANCE (μf)	DC RATED VOLTAGE (VOLTS)	AC VOLTS AT 4KHz	AC VOLTS AT 40KHz	VRMS	CASE SIZE
M83421/1-2239P	.56	50	36	14.4	36	13
M83421/1-2245P	.68	50	36	14	36	13
M83421/1-2251P	.82	50	36	12	36	14
M83421/1-2257P	1.0	50	36	10	36	14
M83421/1-2263P	1.2	50	36	9.1	36	14
M83421/1-2269P	1.5	50	36	7.7	36	14
M83421/1-2275P	1.8	50	36	6.6	36	14
M83421/1-2287P	2.2	50	36	5.8	36	16
M83421/1-2293P	2.7	50	36	5.0	36	17
M83421/1-2305P	3.3	50	36	4.2	36	17
M83421/1-2311P	3.9	50	36	3.7	36	19
M83421/1-2323P	4.7	50	31	3.1	36	21
M83421/1-2335P	5.6	50	26	2.6	36	21
M83421/1-2341P	6.8	50	21.2	2.1	36	22
M83421/1-2353P	8.2	50	17.6	1.8	36	22
M83421/1-2359P	10	50	14.4	1.4	36	22
M83421/1-4005P	.001	200	120	80	120	2
M83421/1-4011P	.0012	200	120	80	120	2
M83421/1-4017P	.0015	200	120	80	120	2
M83421/1-4023P	.0018	200	120	80	120	2
M83421/1-4035P	.0022	200	120	80	120	2
M83421/1-4041P	.0027	200	120	80	120	2
M83421/1-4047P	.0033	200	120	80	120	2
M83421/1-4053P	.0039	200	120	80	120	2
M83421/1-4059P	.0047	200	120	80	120	2
M83421/1-4071P	.0056	200	120	80	120	2
M83421/1-4077P	.0068	200	120	80	120	2
M83421/1-4083P	.0082	200	120	80	120	4
M83421/1-4089P	.01	200	120	80	120	4
M83421/1-4095P	.012	200	120	78	120	4
M83421/1-4101P	.015	200	120	76	120	7
M83421/1-4107P	.018	200	120	74	120	8
M83421/1-4119P	.022	200	120	68	120	8
M83421/1-4125P	.027	200	120	65	120	10
M83421/1-4131P	.033	200	120	62	120	10
M83421/1-4137P	.039	200	120	60	120	10
M83421/1-4143P	.047	200	120	57	120	10
M83421/1-4155P	.056	200	120	56	120	11
M83421/1-4161P	.068	200	120	50	120	11
M83421/1-4167P	.082	200	120	44	120	11
M83421/1-4173P	.1	200	120	42	120	11
M83421/1-4179P	.12	200	120	40	120	11

Table 10-6. Capacitors, Fixed, Supermetalized Plastic Film Dielectric, dc and ac, Hermetically Sealed in Metal Cases (Continued)

PART NUMBER	CAPACITANCE (μf)	DC RATED VOLTAGE (VOLTS)	AC VOLTS AT 4KHz	AC VOLTS AT 40KHz	VRMS	CASE SIZE
M83421/1-4185P	.15	200	120	36	120	14
M83421/1-4191P	.18	200	120	34	120	15
M83421/1-4203P	.22	200	120	32	120	15
M83421/1-4209P	.27	200	120	29	120	17
M83421/1-4215P	.33	200	120	28	120	17
M83421/1-4221P	.39	200	120	27	120	17
M83421/1-4227P	.47	200	120	26	120	17
M83421/1-4239P	.56	200	120	23	120	17
M83421/1-4245P	.68	200	120	20	120	19
M83421/1-4251P	.82	200	120	18	120	20
M83421/1-4257P	1.0	200	120	15	120	20
M83421/1-4263P	1.2	200	120	13.5	120	20
M83421/1-4269P	1.5	200	120	12	120	22
M83421/1-4275P	1.8	200	110	11	120	23
M83421/1-4287P	2.2	200	90.5	9.1	120	23
M83421/1-4299P	2.7	200	77	7.7	120	23
M83421/1-4311P	3.3	200	65	6.5	120	24
M83421/1-4317P	3.9	200	55	5.5	120	25
M83421/1-3005P	.001	100	60	60	240	1
M83421/1-3011P	.0012	100	60	60	240	1
M83421/1-3017P	.0015	100	60	60	240	1
M83421/1-3023P	.0018	100	60	60	240	1
M83421/1-3035P	.0022	100	60	60	240	1
M83421/1-3041P	.0027	100	60	60	240	1
M83421/1-3047P	.0033	100	60	60	240	1
M83421/1-3053P	.0039	100	60	60	240	1
M83421/1-3059P	.0047	100	60	60	240	1
M83421/1-3071P	.0056	100	60	60	240	1
M83421/1-3077P	.0068	100	60	60	240	2
M83421/1-3083P	.0082	100	60	60	240	2
M83421/1-3089P	.01	100	60	60	240	3
M83421/1-3095P	.012	100	60	59	240	3
M83421/1-3101P	.015	100	60	58	240	3
M83421/1-3107P	.018	100	60	57	240	5
M83421/1-3119P	.022	100	60	53	240	5
M83421/1-3125P	.027	100	60	51	240	5
M83421/1-3131P	.033	100	60	50	240	5
M83421/1-3137P	.039	100	60	48	240	8
M83421/1-3143P	.047	100	60	47	240	8
M83421/1-3155P	.056	100	60	46	240	8
M83421/1-3161P	.068	100	60	42	240	9

Table 10-6. Capacitors, Fixed, Supermetalized Plastic Film Dielectric, dc and ac, Hermetically Sealed in Metal Cases (Continued)

PART NUMBER	CAPACITANCE (μf)	DC RATED VOLTAGE (VOLTS)	AC VOLTS AT 4KHz	AC VOLTS AT 40KHz	VRMS	CASE SIZE
M83421/1-3167P	.082	100	60	38	240	10
M83421/1-3173P	.1	100	60	36	240	10
M83421/1-3179P	.12	100	60	35	240	10
M83421/1-3185P	.15	100	60	33	240	11
M83421/1-3191P	.18	100	60	31	240	11
M83421/1-3203P	.22	100	60	27	240	11
M83421/1-3209P	.27	100	60	24	240	12
M83421/1-3215P	.33	100	60	23	240	12
M83421/1-3221P	.39	100	60	22	240	14
M83421/1-3227P	.47	100	60	21	240	14
M83421/1-3239P	.56	100	60	19	240	14
M83421/1-3245P	.68	100	60	16	240	16
M83421/1-3251P	.82	100	60	14	240	16
M83421/1-3257P	1.0	100	60	12	240	18
M83421/1-3263P	1.2	100	60	11	240	18
M83421/1-3269P	1.5	100	60	10	240	19
M83421/1-3281P	2.2	100	60	7.5	240	21
M83421/1-3287P	2.7	100	60	6.5	240	22
M83421/1-3299P	3.3	100	55	5.5	240	22
M83421/1-3305P	3.9	100	49	5.0	240	23
M83421/1-3317P	4.7	100	43	4.3	240	23
M83421/1-3329P	5.6	100	36	3.6	240	23
M83421/1-3335P	6.8	100	29	3.0	240	25
M83421/1-3347P	8.2	100	24.4	2.4	240	25
M83421/1-3353P	10	100	20	2.0	240	25
M83421/1-5005P	.001	400	240	100	240	4
M83421/1-5011P	.0012	400	240	100	240	4
M83421/1-5017P	.0015	400	240	100	240	4
M83421/1-5023P	.0018	400	240	100	240	4
M83421/1-5035P	.0022	400	240	100	240	4
M83421/1-5041P	.0027	400	240	100	240	7
M83421/1-5047P	.0033	400	240	100	240	7
M83421/1-5053P	.0039	400	240	100	240	7
M83421/1-5059P	.0047	400	240	100	240	7
M83421/1-5071P	.0056	400	240	100	240	7
M83421/1-5077P	.0068	400	240	100	240	8
M83421/1-5083P	.0082	400	240	100	240	8
M83421/1-5089P	.01	400	240	100	240	8
M83421/1-5095P	.012	400	240	100	240	8
M83421/1-5101P	.015	400	240	94	240	9
M83421/1-5107P	.018	400	240	90	240	11
M83421/1-5113P	.022	400	240	85	240	11

Table 10-6. Capacitors, Fixed, Supermetalized Plastic Film Dielectric, dc and ac, Hermetically Sealed in Metal Cases (Continued)

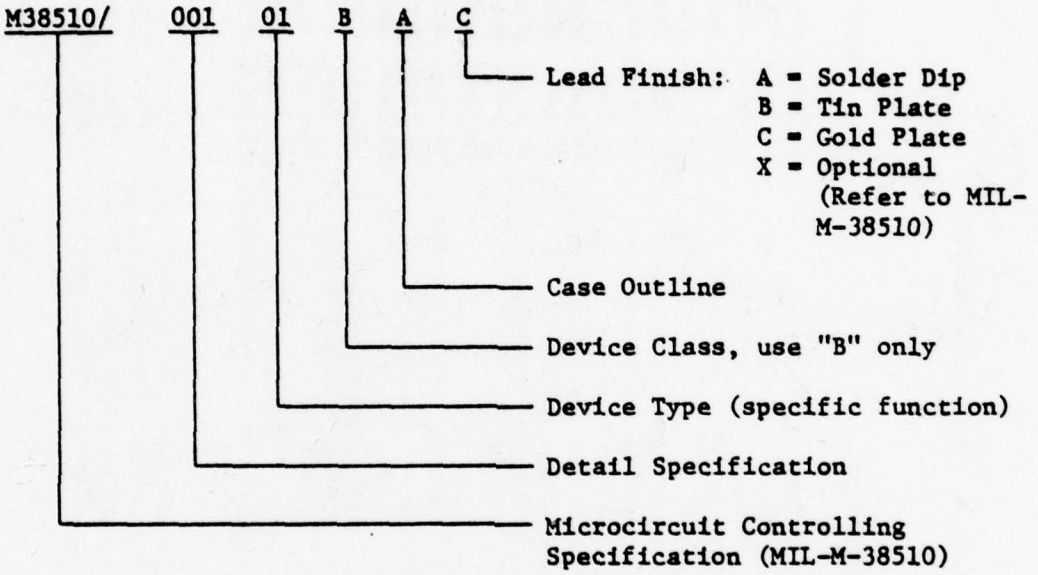
PART NUMBER	CAPACITANCE (μf)	DC RATED VOLTAGE (VOLTS)	AC VOLTS AT 4KHz	AC VOLTS AT 40KHz	VRMS	CASE SIZE
M83241/1-5119P	.027	400	240	81	240	11
M83421/1-5125P	.033	400	240	78	240	11
M83421/1-5131P	.039	400	240	75	240	11
M83421/1-5137P	.047	400	240	71	240	13
M83421/1-5149P	.056	400	240	67.5	240	13
M83421/1-5155P	.068	400	240	60	240	13
M83421/1-5161P	.082	400	240	50	240	14
M83421/1-5167P	.1	400	240	46	240	14
M83421/1-5173P	.12	400	240	44.5	240	14
M83421/1-5179P	.15	400	240	40	240	15
M83421/1-5281P	.18	400	240	38	240	17
M83421/1-5191P	.22	400	240	35	240	17
M83421/1-5197P	.27	400	240	33	240	19
M83421/1-5203P	.33	400	240	32	240	19
M83421/1-5209P	.39	400	240	32	240	20
M83421/1-5215P	.47	400	240	31	240	20
M83421/1-5227P	.56	400	240	29	240	20
M83421/1-5233P	.68	400	240	26	240	23
M83421/1-5239P	.82	400	234	23.4	240	23
M83421/1-5245P	1.0	400	208	20.8	240	23
M83421/1-5251P	1.2	400	183	18.3	240	24
M83421/1-5257P	1.5	400	160	16.0	240	25
M83421/1-5263P	1.8	400	150	15.0	240	25

Appendix B

STANDARD MICROCIRCUITS

20. STANDARD MICROCIRCUITS

20.1 Part number. Part numbers have the following form:



20.2 Standard MIL-M-38510 microcircuits. All standard MIL-M-38510 microcircuits are listed by military part number in Table 20-1. The microcircuits are listed by function in the following tables:

Table 20-2. Digital TTL Microcircuits

Table 20-3. Digital Schottky TTL Microcircuits

Table 20-4. Digital Low Power Schottky TTL Microcircuits

Table 20-5. Digital Memory Microcircuits

Table 20-6. Digital ECL Microcircuits

Table 20-7. Linear Microcircuits

Table 20-1. Standard MIL-M-38510 Microcircuits

PART NUMBER 1/	INDUSTRY TYPE	FUNCTION	PACKAGE
M38510/00101BCX	5430	TTL NAND gate, single, 8-input	14 lead, dual-in-line
M38510/00102BCX	5420	TTL NAND gate, dual, 4-input	14 lead, dual-in-line
M38510/00103BCX	5410	TTL NAND gate, triple, 3-input	14 lead, dual-in-line
M38510/00104BCX	5400	TTL NAND gate, quad, 2-input	14 lead, dual-in-line
M38510/00105BCX	5404	TTL NAND gate, hex, 1-input	14 lead, dual-in-line
M38510/00107BCX	5401	TTL NAND gate, quad, 2-input, open collector	14 lead, dual-in-line
M38510/00108BCX	5405	TTL NAND gate, hex, 1-input, open collector	14 lead, dual-in-line
M38510/00201BCX	5472	TTL flip-flop, single, J-K master slave	14 lead, dual-in-line
M38510/00202BCX	5473	TTL flip-flop, dual, J-K master slave, no preset	14 lead, dual-in-line
M38510/00204BEX	5476	TTL flip-flop, dual, J-K master slave	16 lead, dual-in-line
M38510/00205BCX	5474	TTL flip-flop, dual, D type, edge triggered	14 lead, dual-in-line
M38510/00301BCX	5440	TTL buffer, NAND, dual, 4-input	14 lead, dual-in-line
M38510/00302BCX	5437	TTL buffer, NAND, quad, 2-input	14 lead, dual-in-line
M38510/00303BCX	5438	TTL buffer, NAND, quad, 2-input, open collector	14 lead, dual-in-line
M38510/00401BCX	5402	TTL NOR gate, quad, 2-input	14 lead, dual-in-line
M38510/00404BCX	5427	TTL NOR gate, triple, 3-input	14 lead, dual-in-line
M38510/00502BCX	5451	TTL AND-OR-invert gate, dual, 2-wide 2-input	14 lead, dual-in-line
M38510/00504BCX	5454	TTL AND-OR-invert gate, single, 4-wide 2-input	14 lead, dual-in-line
M38510/00602BEX	5483	TTL full adder, binary, 4-bit	16 lead, dual-in-line
M38510/00701BCX	5486	TTL exclusive-OR gate, quad, 2-input	14 lead, dual-in-line
M38510/00801BCX	5406	TTL buffer/driver, inverting, hex, 30-volt output	14 lead, dual-in-line

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

Table 20-1. Standard MIL-M-38510 Microcircuits (Continued)

PART NUMBER 1/	INDUSTRY TYPE	FUNCTION	PACKAGE
M38510/00803BCX	5407	TTL buffer/driver, noninverting, hex, 30 volt output	14 lead, dual-in-line
M38510/00901BCX	5495	TTL shift register, 4-bit, right/left shift	14 lead, dual-in-line
M38510/00903BCX	54164	TTL shift register, 8-bit, parallel out	14 lead, dual-in-line
M38510/00904BEX	54165	TTL shift register, 8-bit, parallel load	16 lead, dual-in-line
M38510/01101BJX	54181	TTL arithmetic logic unit/function generator, 4-bit	24 lead, dual-in-line
M38510/01102BEX	54182	TTL lookahead carry generator	16 lead, dual-in-line
M38510/01201BCX	54121	TTL multivibrator, single, monostable	14 lead, dual-in-line
M38510/01203BEX	54123	TTL multivibrator, dual, monostable, retriggerable	16 lead, dual-in-line
M38510/01302BCX	5493	TTL counter, asynchronous, 4-bit binary	14 lead, dual-in-line
M38510/01308BEX	54192	TTL counter, synchronous, decade, up/down	16 lead, dual-in-line
M38510/01309BEX	54193	TTL counter, synchronous, 4-bit binary, up/down	16 lead, dual-in-line
M38510/01403BCX	54153	TTL multiplexer, dual, 4-input with enable	16 lead, dual-in-line
M38510/01404BEX	9309	TTL multiplexer, dual, 4-input without enable	16 lead, dual-in-line
M38510/01405BEX	9322	TTL multiplexer, dual, 2-input with enable	16 lead, dual-in-line
M38510/01406BEX	54151	TTL multiplexer, single, 8-input with enable	16 lead, dual-in-line
M38510/01501BEX	5475	TTL latch, bistable, 4-bit, complementary outputs	16 lead, dual-in-line
M38510/01502BCX	5477	TTL latch, bistable, 4-bit	14 lead, dual-in-line
M38510/01601BCX	5408	TTL AND gate, quad, 2-input	14 lead, dual-in-line
M38510/01602BCX	5409	TTL AND gate, quad, 2-input, open collector	14 lead, dual-in-line
M38510/01701BEX	54174	TTL flip-flop, hex, D type, edge triggered	16 lead, dual-in-line
M38510/01702BEX	54174	TTL flip-flop, quad, D type, edge triggered	16 lead, dual-in-line
M38510/06001BEX	10501	ECL OR/NOR gate, quad with strobe	16 lead, dual-in-line
M38510/06002BEX	10502	ECL OR/NOR gate, triple or single OR/NOR	16 lead, dual-in-line
M38510/06004BEX	10506	ECL NOR gate, triple 3-4-3-input	16 lead, dual-in-line
M38510/06005BEX	10507	ECL exclusive OR/NOR gate, triple 2-input	16 lead, dual-in-line
M35810/06006BEX	10509	ECL OR/NOR gate, dual 4-5-input	16 lead, dual-in-line
M38510/07001BCX	54S00	Schottky TTL NAND gate, quad, 2-input	14 lead, dual-in-line
M38510/07002BCX	54S03	Schottky TTL NAND gate, quad, 2-input open collector	14 lead, dual-in-line

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

Table 20-1. Standard MIL-M-38510 Microcircuits (Continued)

PART NUMBER 1/	INDUSTRY TYPE	FUNCTION	PACKAGE
M38510/07003BCX	54S04	Schottky TTL NAND gate, hex, 1-input	14 lead, dual-in-line
M38510/07004BCX	54S05	Schottky TTL NAND gate, hex, 1-input, open collector	14 lead, dual-in-line
M38510/07005BCX	54S10	Schottky TTL NAND gate, triple, 3-input	14 lead, dual-in-line
M38510/07006BCX	54S20	Schottky TTL NAND gate, dual, 4-input	14 lead, dual-in-line
M38510/07007BCX	54S22	Schottky TTL NAND gate, dual, 4-input, open collector	14 lead, dual-in-line
M38510/07101BCX	54S74	Schottky TTL flip-flop, dual, D type, edge triggered	14 lead, dual-in-line
M38510/07201BCX	54S40	Schottky TTL buffer, dual, 4-input	14 lead, dual-in-line
M38510/07301BCX	54S02	Schottky TTL NOR gate quad, 2-input	14 lead, dual-in-line
M38510/07401BCX	54S51	Schottky TTL AND-OR-invert, dual, 2-wide 2-input	14 lead, dual-in-line
M38510/07402BCX	54S64	Schottky TTL AND-OR-invert, 4-2-3-2 input	14 lead, dual-in-line
M38510/07403BCX	54S65	Schottky TTL AND-OR-invert, 4-2-3-2 input, open collector	14 lead, dual-in-line
M38510/08001BCX	54S11	Schottky TTL AND gate, triple, 3-input	14 lead, dual-in-line
M38510/08002BCX	54S15	Schottky TTL AND gate, triple, 3-input, open collector	14 lead, dual-in-line
M38510/10101BCX	741	Operational amplifier, single, internally compensated	14 lead, dual-in-line
M38510/10101BGX	741	Operational amplifier, single, internally compensated	8 lead, can
M38510/10102BCX	747	Operational amplifier, dual, internally compensated	14 lead, dual-in-line
M38510/10102BIX	747	Operational amplifier, dual, internally compensated	10 lead, can
M38510/10103BCX	101A	Operational amplifier, single, externally compensated	14 lead, dual-in-line
M38510/10103BGX	101A	Operational amplifier, single, externally compensated	8 lead, can
M38510/10104BCX	108A	Operational amplifier, single, externally compensated	14 lead, dual-in-line
M38510/10104BGX	108A	Operational amplifier, single, externally compensated	8 lead, can

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

Table 20-1. Standard MIL-M-38510 Microcircuits (Continued)

PART NUMBER 1/	INDUSTRY TYPE	FUNCTION	PACKAGE
M38510/10201BCX	723	Voltage regulator, precision	14 lead, dual-in-line
M38510/10201BIX	723	Voltage regulator, precision	10 lead, can
M38510/10301BCX	710	Voltage comparator, single, differential	14 lead, dual-in-line
M38510/10301BGX	710	Voltage comparator, single, differential	8 lead, can
M38510/10402BCX	55108	Line receiver, dual, open collector	14 lead, dual-in-line
M38510/10403BEX	55114	Line driver, dual, differential	16 lead, dual-in-line
M38510/10404BEX	55115	Line receiver, dual, differential	16 lead, dual-in-line
M38510/10405BEX	55113	Line driver, dual, differential, 3-state out	16 lead, dual-in-line
M38510/10802BCX	3045	Transistor array, NPN 3-single plus differential pair	14 lead, dual-in-line
M38510/15001BEX	5485	TTL magnitude comparator, 4-bit	16 lead, dual-in-line
M38510/20101BJX	MCM5303	Bipolar PROM, 512-bit (64 word), open collector	24 lead, dual-in-line
M38510/30001BCX	54LS00	Low power Schottky TTL NAND gate, quad 2-input	14 lead, dual-in-line
M38510/30002BCX	54LS03	Low power Schottky TTL NAND gate, quad 2-input, open collector	14 lead, dual-in-line
M38510/30003BCX	54LS04	Low power Schottky TTL NAND gate, hex, 1-input	14 lead, dual-in-line
M38510/30004BCX	54LS05	Low power Schottky TTL NAND gate, hex, 1-input, open collector	14 lead, dual-in-line
M38510/30005BCX	54LS10	Low power Schottky TTL NAND gate, triple, 3-input	14 lead, dual-in-line
M38510/30006BCX	54LS12	Low power Schottky TTL NAND gate, triple, 3-input, open collector	14 lead, dual-in-line
M38510/30007BCX	54LS20	Low power Schottky TTL NAND gate, dual, 4-input	14 lead, dual-in-line
M38510/30008BCX	54LS22	Low power Schottky TTL NAND gate, dual, 4-input, open collector	14 lead, dual-in-line
M38510/30009BCX	54LS30	Low power Schottky TTL NAND gate, single, 8-input	14 lead, dual-in-line
M38510/30202BCX	54LS37	Low power Schottky TTL NAND buffer, quad, 2-input	14 lead, dual-in-line

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

46

Table 20-1. Standard MIL-M-38510 Microcircuits (Continued)

PART NUMBER 1/	INDUSTRY TYPE	FUNCTION	PACKAGE
M38510/30301BCX	54LS02	Low power Schottky TTL NOR gate, quad, 2-input	14 lead, dual-in-line
M38510/30302BCX	54LS27	Low power Schottky TTL NOR gate, triple, 3-input	14 lead, dual-in-line
M38510/30303BCX	54LS266	Low power Schottky TTL exclusive NOR gate, triple, 3-input	14 lead, dual-in-line
M38510/30401BCX	54LS51	Low power Schottky TTL AND-OR-invert gate, dual 2-wide, 2-input	14 lead, dual-in-line
M38510/30402BCX	54LS54	Low power Schottky TTL AND-OR-invert gate, single, 4 wide, 2-input	14 lead, dual-in-line

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

47

Table 20-2. Standard MIL-M-38510 Digital TTL Microcircuits

Function	Package	Part Number 1/	Industry Type
Gates			
NAND, single, 8-input	14 lead, dual-in-line	M38510/00101BCX	5430
NAND, dual, 4-input	14 lead, dual-in-line	M38510/00102BCX	5420
NAND, triple, 3-input	14 lead, dual-in-line	M38510/00103BCX	5410
NAND, quad, 2-input	14 lead, dual-in-line	M38510/00104BCX	5400
NAND, hex, 1-input	14 lead, dual-in-line	M38510/00105BCX	5404
NAND, quad, 2-input, open collector	14 lead, dual-in-line	M38510/00107BCX	5401
NAND, hex, 1-input, open collector	14 lead, dual-in-line	M38510/00108BCX	5405
NOR, quad, 2-input	14 lead, dual-in-line	M38510/00401BCX	5402
NOR, triple, 3-input	14 lead, dual-in-line	M38510/00404BCX	5427
AND-OR-invert, dual, 2-wide 2-input	14 lead, dual-in-line	M38510/00502BCX	5451
AND-OR-invert, single, 4-wide 2-input	14 lead, dual-in-line	M38510/00504BCX	5454
Exclusive-OR, quad, 2-input	14 lead, dual-in-line	M38510/00701BCX	5486
AND, quad, 2-input	14 lead, dual-in-line	M38510/01601BCX	5408
AND, quad, 2-input, open collector	14 lead, dual-in-line	M38510/01602BCX	5409
Buffers/Drivers			
NAND, dual, 4-input	14 lead, dual-in-line	M38510/00301BCX	5440
NAND, quad, 2-input	14 lead, dual-in-line	M38510/00302BCX	5437
NAND, quad, 2-input, open collector	14 lead, dual-in-line	M38510/00303BCX	5438
Inverting, hex, 30 volt output	14 lead, dual-in-line	M38510/00801BCX	5406
Noninverting, hex, 30 volt output	14 lead, dual-in-line	M38510/00803BCX	5407

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

48

Table 20-2. Standard MIL-M-38510 Digital TTL Microcircuits (Continued)

Function	Package	Part Number 1/	Industry Type
Flip-flops			
Single, J-K master slave	14 lead, dual-in-line	M38510/00201BCX	5472
Dual, J-K master slave, no preset	14 lead, dual-in-line	M38510/00202BCX	5473
Dual, J-K master slave	16 lead, dual-in-line	M38510/00204BEX	5476
Dual, D type, edge triggered	14 lead, dual-in-line	M38510/00205BCX	5474
QUAD, D type, edge triggered	16 lead, dual-in-line	M38510/01702BEX	54175
HEX, D type, edge triggered	16 lead, dual-in-line	M38510/01701BEX	54174
Latches			
Bistable, 4-bit, complementary outputs	16 lead, dual-in-line	M38510/01501BEX	5475
Bistable, 4-bit	14 lead, dual-in-line	M38510/01502BCX	5477
Multivibrators			
Single, monostable	14 lead, dual-in-line	M38510/01201BCX	54121
Dual, monostable, retriggerable	16 lead, dual-in-line	M38510/01203BEX	54123
Shift registers			
4-bit, right/left shift	14 lead, dual-in-line	M38510/00901BCX	5495
8-bit, parallel out	14 lead, dual-in-line	M38510/00903BCX	54164
8-bit, parallel load	16 lead, dual-in-line	M38510/00904BEX	54165

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

94

Table 20-2. Standard MIL-M-38510 Digital TTL Microcircuits (Continued)

Function	Package	Part Number 1/	Industry Type
Counters			
Asynchronous, 4-bit binary	14 lead, dual-in-line	M38510/01302BCX	5493
Synchronous, decade, up/down	16 lead, dual-in-line	M38510/01308BEX	54192
Synchronous, 4-bit binary, up/down	16 lead, dual-in-line	M38510/01309BEX	54193
Multiplexers			
Dual, 4-input with enable	16 lead, dual-in-line	M38510/01403BEX	54153
Dual,4-input without enable	16 lead, dual-in-line	M38510/01404BEX	9309
Quad, 2-input with enable	16 lead, dual-in-line	M38510/01405BEX	9322
Single, 8-input with enable	16 lead, dual-in-line	M38510/01406BEX	54151
Adders			
Binary, full adder, 4-bit	16 lead, dual-in-line	M38510/00602BEX	5483
Arithmetic Circuits			
Arithmetic logic unit/function generator, 4-bit	24 lead, dual-in-line	M38510/01101BJX	54181
Lookahead carry generator	16 lead, dual-in-line	M38510/01102BEX	54182
Magnitude comparator, 4-bit	16 lead, dual-in-line	M38510/15001BEX	5485

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

Table 20-3. Standard MIL-M-38510 Digital Schottky TTL Microcircuits

Function	Package	Part Number 1/	Industry Type
Gates			
NAND, dual, 4-input	14 lead, dual-in-line	M38510/07006BCX	54S20
NAND, dual, 4-input, open collector	14 lead, dual-in-line	M38510/07007BCX	54S22
NAND, triple, 3-input	14 lead, dual-in-line	M38510/07005BCX	54S10
NAND, quad, 2-input	14 lead, dual-in-line	M38510/07001BCX	54S00
NAND, hex, 1-input	14 lead, dual-in-line	M38510/07003BCX	54S04
NAND, quad, 2-input, open collector	14 lead, dual-in-line	M38510/07002BCX	54S03
NAND, hex, 1-input, open collector	14 lead, dual-in-line	M38510/07004BCX	54S05
NOR, quad, 2-input	14 lead, dual-in-line	M38510/07301BCX	54S02
AND-OR-invert, dual, 2-wide 2-input	14 lead, dual-in-line	M38510/07401BCX	54S51
AND-OR-invert, 4-2-3-2 input	14 lead, dual-in-line	M38510/07402BCX	54S64
AND-OR-invert, 4-2-3-2 input, open collector	14 lead, dual-in-line	M38510/07403BCX	54S65
AND, triple, 3-input	14 lead, dual-in-line	M38510/08001BCX	54S11
AND, triple, 3-input, open collector	14 lead, dual-in-line	M38510/08002BCX	54S15
Buffers/Drivers			
NAND, dual, 4-input	14 lead, dual-in-line	M38510/07201BCX	54S40
Flip-flops			
Dual, D type, edge triggered	14 lead, dual-in-line	M38510/07101BCX	54S74

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

Table 20-4. Standard MIL-M-38510 Digital Low Power Schottky TTL Microcircuits

Function	Package	Part Number 1/	Industry Type
Gates			
NAND, single, 8-input	14 lead, dual-in-line	M38510/30009BCX	54LS30
NAND, dual, 4-input	14 lead, dual-in-line	M38510/30007BCX	54LS20
NAND, triple, 3-input	14 lead, dual-in-line	M38510/30005BCX	54LS10
NAND, quad, 2-input	14 lead, dual-in-line	M38510/30001BCX	54LS00
NAND, hex, 1-input	14 lead, dual-in-line	M38510/30003BCX	54LS04
NAND, quad, 2-input, open collector	14 lead, dual-in-line	M38510/30002BCX	54LS03
NAND, hex, 1-input, open collector	14 lead, dual-in-line	M38510/30004BCX	54LS05
NAND, dual, 4-input, open collector	14 lead, dual-in-line	M38510/30008BCX	54LS22
NAND, triple, 3-input, open collector	14 lead, dual-in-line	M38510/30006BCX	54LS12
AND-OR-invert, dual, 2-wide 2-input	14 lead, dual-in-line	M38510/30401BCX	54LS51
AND-OR-invert, single, 4-wide, 2-input	14 lead, dual-in-line	M38510/30402BCX	54LS54
NOR, quad, 2-input	14 lead, dual-in-line	M38510/30301BCX	54LS02
NOR, triple, 3-input	14 lead, dual-in-line	M38510/30302BCX	54LS27
Exclusive NOR, quad, 2-input	14 lead, dual-in-line	M38510/30303BCX	54LS266
Buffers/Drivers			
NAND, quad, 2-input	14 lead, dual-in-line	M38510/30202BCX	54LS37

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

Table 20-5. Standard MIL-M-38510 Digital Memories

Function	Package	Part Number 1/	Industry Type
Bipolar			
PROM, 512-bit (64 word), open collector	24 lead, dual-in-line	M38510/20101BJX	MCM5303

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

Table 20-6. Standard MIL-M-38510 Digital ECL Microcircuits

Function	Package	Part Number 1/	Industry Type
Gates			
Exclusive OR/NOR gate, triple 2-input	16 lead, dual-in-line	M38510/06005BEX	10507
NOR gate, triple 3-4-3-input	16 lead, dual-in-line	M38510/06004BEX	10506
OR/NOR gate, dual 4-5-input	16 lead, dual-in-line	M38510/06006BEX	10509
OR/NOR gate, quad with strobe	16 lead, dual-in-line	M38510/06001BEX	10501
OR/NOR gate, triple or single OR/NOR	16 lead, dual-in-line	M38510/06002BEX	10502

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

54

Table 20-7. Standard MIL-M-38510 Linear Microcircuits

Function	Package	Part Number 1/	Industry Type
Operational amplifiers			
Single, internally compensated	14 lead, dual-in-line	M38510/10101BCX	741
Single, internally compensated	8 lead, can	M38510/10101BGX	741
Dual, internally compensated	14 lead, dual-in-line	M38510/10102BCX	747
Dual, internally compensated	10 lead, can	M38510/10102BIX	747
Single, externally compensated	14 lead, dual-in-line	M38510/10103BCX	101A
Single, externally compensated	8 lead, can	M38510/10103BGX	101A
Single, externally compensated	14 lead, dual-in-line	M38510/10104BCX	108A
Single, externally compensated	8 lead, can	M38510/10104BGX	108A
Voltage regulators			
Precision	14 lead, dual-in-line	M38510/10201BCX	723
Precision	10 lead, can	M38510/10201BIX	723
Voltage comparators			
Single, differential	14 lead, dual-in-line	M38510/10301BCX	710
Single, differential	8 lead, can	M38510/10301BGX	710
Line drivers/receivers			
Receiver, dual, open collector	14 lead, dual-in-line	M38510/10402BCX	55108
Driver, dual, differential	16 lead, dual-in-line	M38510/10403BEX	55114
Receiver, dual differential	16 lead, dual-in-line	M38510/10404BEX	55115
Driver, dual, differential, 3-state out	16 lead, dual-in-line	M38510/10405BEX	55113
Transistor array			
NPN 3-single plus differential pair	14 lead, dual-in-line	M38510/10802BCX	3045

1/ The last character, X, of the part number indicates optional lead finish (solder dip, tin plate, or gold plate). The "X" will not be marked on the part. The designation for the lead finish actually supplied by the manufacturer will be marked on the part. If a particular lead finish is required, use the appropriate designator specified in 20.1. Refer to QPL38510 for availability of lead finishes.

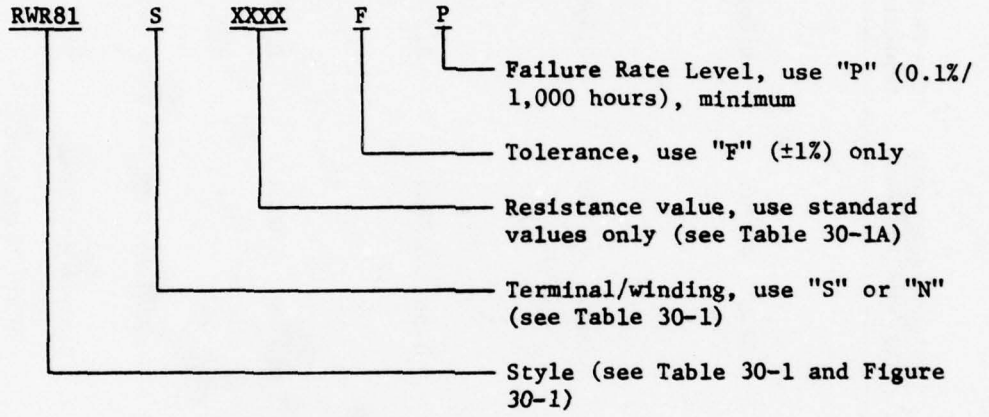
Appendix C

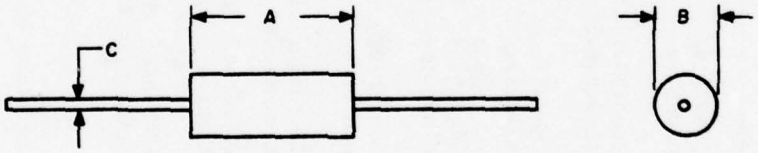
STANDARD RESISTORS

30. STANDARD RESISTORS

30.1 Resistors, fixed, power, wirewound (MIL-R-39007). The part numbers listed in Table 30-1, when used in conjunction with the standard resistance decades listed in Table 30-1A, are the standard MIL-R-39007 fixed, power, wirewound resistors. Part sizes are as shown in Figure 30-1.

30.1.1 Part number. Part number uses the following form:





Style	Dimensions (inches) A Max	B Max	C
RWR81	.281	.105	.0200 ±.0015
RWR80	.437	.125	.0200 ±.0015
RWR89	.622	.218	.032 ±.002
RWR74	.875	.312	.040 ±.002

Figure 30-1. MIL-R-39007 Outline and Dimensions

Table 30-1. Standard MIL-R-39007 Fixed, Power, Wirewound Resistors

Part Number 1/	Rated Power @25°C (Watts)	Terminal/ Winding	Resistance Range (Ohms)2/	Maximum Inductance ≤50 Ohms	Maximum Inductance >50 Ohms	Max Parallel Capacitance	Specification MIL-R-39007/
RWR81SXXXXFP	1	Solderable/ Inductive	.100 to 464				9
RWR81NXXXXFP	1	Solderable/ Noninductive	10.0 to 234	0.08μH	0.11μH	0.2pF	9
RWR80SXXXXFP	2	Solderable/ Inductive	.100 to 1210				8
RWR80NXXXXFP	2	Solderable/ Noninductive	10.0 to 604	0.06μH	0.18μH	0.8pF	8
RWR89SXXXXFP	3	Solderable/ Inductive	.100 to 3570				11
RWR89NXXXXFP	3	Solderable/ Noninductive	10.0 to 1780	0.13μH	0.38μH	0.75pF	11
RWR74SXXXXFP	5	Solderable/ Inductive	.100 to 12,100				6
RWR74NXXXXFP	5	Solderable/ Noninductive	10.0 to 6040	0.35μH	0.60μH	1.0pF	6

1/ The following resistance-temperature characteristics are applicable to all part numbers:

Resistance	Resistance Change
Below 1 Ohm	±90PPM/°C Maximum
1 Ohm to below 10 Ohm	±50PPM/°C Maximum
10 Ohm and above	±20PPM/°C Maximum

2/ See Table 30-1A for standard resistance values.

Table 30-1A. Standard MIL-R-39007 Resistance Values for the 100 to 1000 Decade 1/ 2/

100	121	147	178	215	261	316	383	464	562	681	825
102	124	150	182	221	267	324	392	475	576	698	845
105	127	154	187	226	274	332	402	487	590	715	866
107	130	158	191	232	280	340	412	499	604	732	887
110	133	162	196	237	287	348	422	511	619	750	909
113	137	165	200	243	294	357	432	523	634	768	931
115	140	169	205	249	301	365	442	536	649	787	953
118	143	174	210	255	309	374	453	549	665	806	976

1/ For resistance value of 100Ω or greater, designate resistance in part number with significant figures from tabulation followed by a digit showing the number of following zeros, e.g., 1470Ω is "1471" in part number. For resistance value less than 100Ω use "R" to show location of decimal point, e.g., 6.81Ω is "6R81.

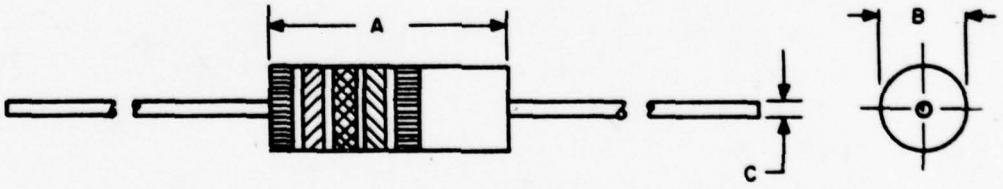
2/ Standard values are limited to the applicable resistance ranges specified in Table 30-1.

30.2 Resistors, fixed, composition (MIL-R-39008). The part numbers listed in Table 30-2, when used in conjuction with the standard resistance decades listed in Table 30-2A, are the standard MIL-R-39008 fixed, composition resistors. Part sizes are as shown in Figure 30-2.

30.2.1. Part number. Part number uses the following form:

RCR07 G XXX J P

- P — Failure rate level, use "P" (0.1%/1,000 hours), minimum
- J — Tolerance, use "J" (±5%) only
- XXX — Resistance value, use standard values only (see Table 30-2A)
- G — Characteristic, use "G" only
- RCR07 — Style (see Table 30-2 and Figure 30-2)



Style	Dimensions (inches) A Max	B Max	C
RCR05	.160	.066	.015 ±.003
RCR07	.281	.098	.025 ±.002
RCR20	.416	.161	.031 ±.005
RCR32	.593	.240	.040 ±.005
RCR42	.728	.336	.045 ±.003

Figure 30-2. MIL-R-39008 Outline and Dimensions

Table 30-2. Standard MIL-R-39008 Fixed, Composition Resistors

Part Number	Rated Power @70°C (Watts)	Resistance Range (Ohms)	Resistance Tolerance	Rated dc or rms Voltage	Specification MIL-R-39008/
RCR05GXXXJP	1/8	2.7 to 22M	±5%	150	4
RCR07GXXXJP	1/4	2.7 to 22M	±5%	250	1
RCR20GXXXJP	1/2	2.7 to 22M	±5%	350	2
RCR32GXXXJP	1	2.7 to 22M	±5%	500	3
RCR42GXXXJP	2	10 to 22M	±5%	500	5

Table 30-2A. Standard MIL-R-39008 Resistance Values for the 10 to 100 Decade 1/ 2/

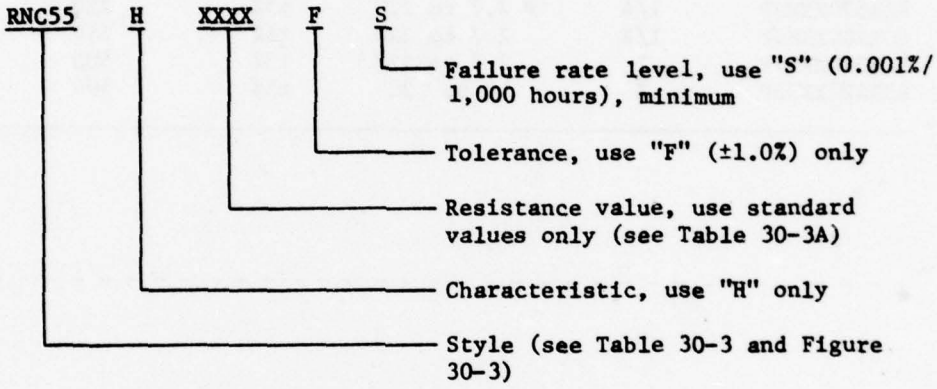
10	18	33	56
11	20	36	62
12	22	39	68
13	24	43	75
15	27	47	82
16	30	51	91

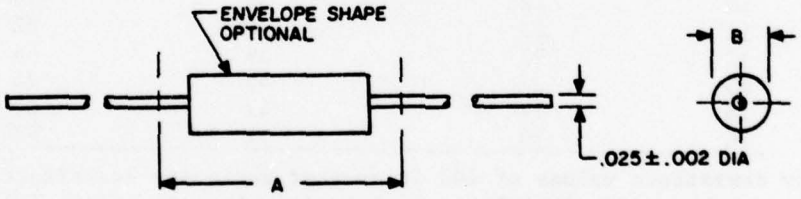
1/ For resistance values of 10Ω or greater designate resistance in part number with significant figures from the tabulation followed by a digit showing the number of following zeros, e.g., 2700Ω is "272" in part number. For resistance values less than 10Ω use "R" to show location of decimal point, e.g., 4.7Ω is "4R7."

2/ Standard values are limited to the applicable resistance ranges specified in Table 30-2.

30.3 Resistors, fixed, film, high stability (MIL-R-55182). The part numbers listed in Table 30-3, when used in conjunction with the standard resistance decades listed in Table 30-3A, are the standard MIL-R-55182 fixed, film, high stability resistors. Part sizes are as shown in Figure 30-3.

30.3.1 Part number. Part number uses the following form:





"A" dimension maximum length is "clean lead" to "clean lead".

	Dimensions (inches)	
Style	A Max	B Max
RNC50	.244	.080 (Lead diameter .016±.002)
RNC55	.379	.140
RNC60	.561	.165
RNC65	.780	.250

Figure 30-3. MIL-R-55182 Outline and Dimensions

Table 30-3. Standard MIL-R-55182 Fixed, Film, High Stability Resistors

Part Number	Rated Power (Watts) 70°C	125°C	Characteristic Nonhermetic	Resistance Range (Ohms)	Resistance Tolerance	Voltage Rating (Volts)	Specification MIL-R-55182
RNC50HXXXXFS	1/10	1/20	±50PPM/°C	10.0 to 200K	±1.0%	200	7
RNC55HXXXXFS	1/8	1/10	±50PPM/°C	24.9 to 604K	±1.0%	200	1
RNC60HXXXXFS	1/4	1/8	±50PPM/°C	24.9 to 1.0M	±1.0%	250	3
RNC65HXXXXFS	1/2	1/4	±50PPM/°C	24.9 to 1.0M	±1.0%	300	5

Table 30-3A. Standard MIL-R-55182 Resistance Values for the 100 to 1000 Decade 1/ 2/

100	121	147	178	215	261	316	383	464	562	681	825
102	124	150	182	221	267	324	392	475	576	698	845
105	127	154	187	226	274	332	402	487	590	715	866
107	130	158	191	232	280	340	412	499	604	732	887
110	133	162	196	237	287	348	422	511	619	750	909
113	137	165	200	243	294	357	432	523	634	768	931
115	140	169	205	249	301	365	442	536	649	787	953
118	143	174	210	255	309	374	453	549	665	806	976

1/ For resistance value of 100Ω or greater, designate resistance in part number with significant figures from tabulation followed by a digit showing the number of following zeros, e.g., 1470Ω is "1471" in part number. For resistance value less than 100Ω use "R" to show location of decimal point, e.g., 68.1Ω is "68R1."

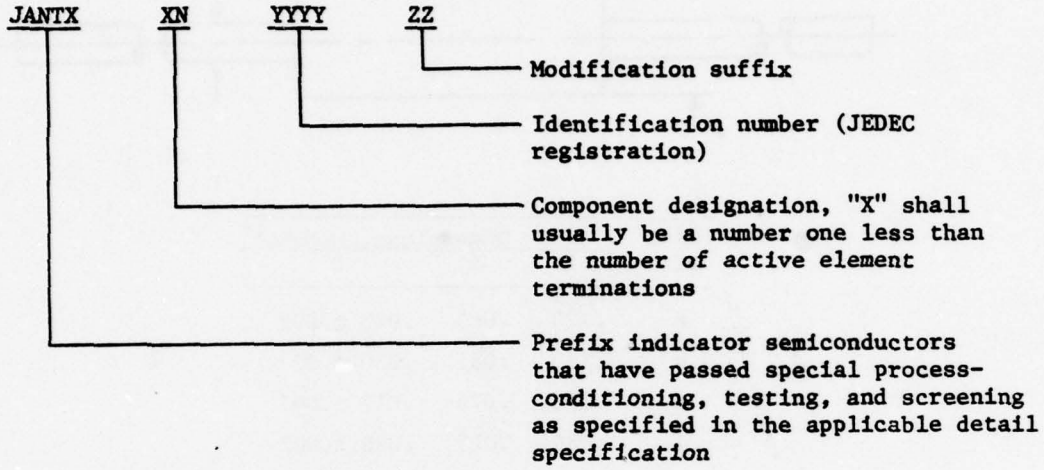
2/ Standard values are limited to the applicable resistance ranges specified in Table 30-3.

62

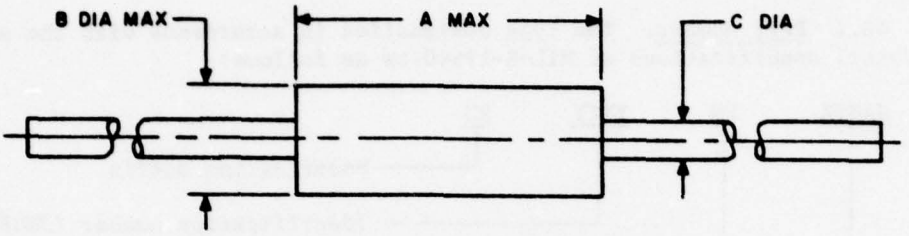
STANDARD SEMICONDUCTORS

40. STANDARD SEMICONDUCTORS

40.1 Part number. The type designation in accordance with the applicable detail specifications of MIL-S-19500 is as follows:



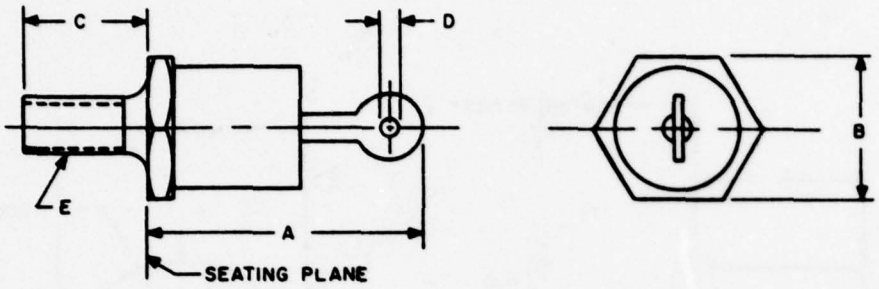
40.2 Case outline. Diode, transistor and thyristor case sizes are shown in Figures 40-1 through 40-5.



Case Size*	Dimensions (inches) A	B	C
a	.120	.065	.020 ±.002
b	.160	.085	.030 ±.002
c	.170	.076	.017 ±.003
d	.180	.075	.020 ±.002
e	.225	.110	.030 +.003 −.004
f	.260	.180	.040 +.002 −.003
g	.275	.110	.031 ±.002
h	.300	.155	.040 +.002 −.003
i	.300	.180	.040 +.002 −.003
j	.435	.185	.030 +.004 −.003
k	.250	.085	.028 ±.002
m	.300	.165	.040 +.002 −.003
n	.165	.165	.038 ±.002
p	.300	.145	.040 ±.002
DO-7	.300	.107	.020 ±.002
DO-14	.400	.140	.051 ±.005

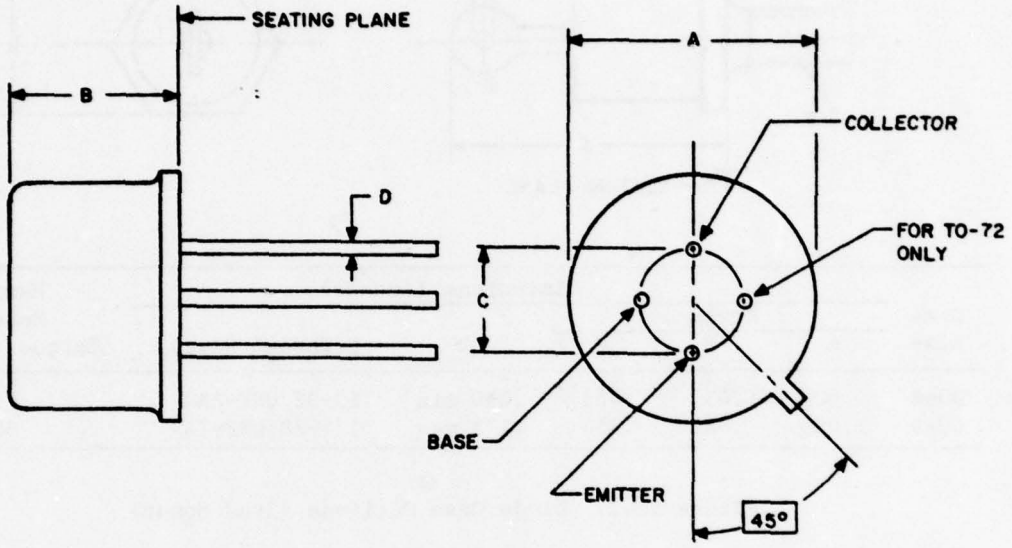
* Case sizes a through p are nonregistered.

Figure 40-1. Diode Case Outlines (Axial Leads)



Case Size	Dimensions (inches) Maximum A	B	C	D	E(Thread Size)	Maximum Mounting Torque (in-lbs)
DO-4	.800	.437	.453	.060 min	10-32 UNF-2A	15
DO-5	1.000	.687	.453	.175 max	1/4-28 UNF-2A	30

Figure 40-2. Diode Case Outlines (Stud Mount)



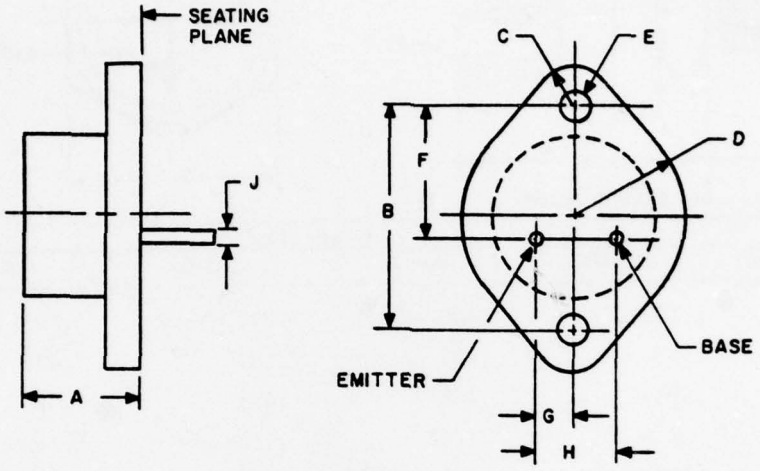
Case Size	Dimensions (inches) Maximum A	Maximum B	T.P. C	D 3/ Min	D 3/ Max
TO-18, TO-72 1/	.230	.210	.100	.016	.021
TO-5, TO-39	.370	.260	.200	.016	.021
TO-99 2/	.370	.185	.200	.016	.021

1/ The TO-72 has a fourth lead (see pictorial above) connected to the case.

2/ The TO-99 has 8 leads equally spaced around the circumference of the "C" dimension, numbered 1 to 8 CCW, with number 1 at emitter location above.

3/ Dimensions pertain to all leads.

Figure 40-3. Transistor Case Outlines, Low Power

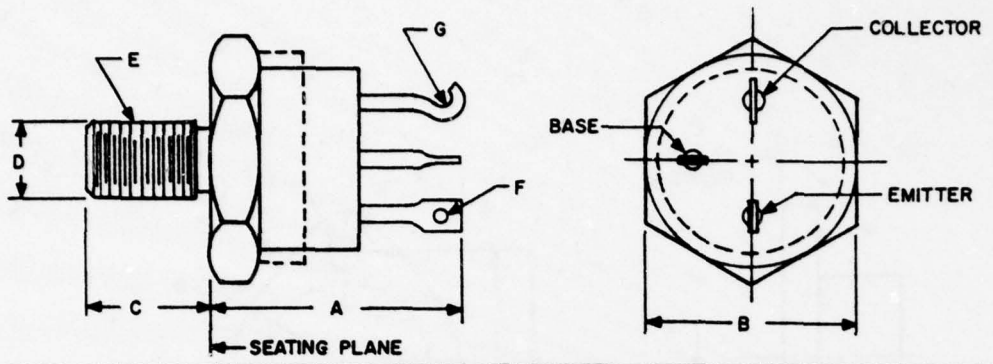


Collector connected internally to case

Dimension 1/	Case Size TO-3	Case Size TO-66
A (max)	.450	.340
B	1.187 ±.010	.960 ±.002
C (max)	.188	.145
D (max)	.525	.350
E diameter (2 holes)	.156 ±.005	.147 ±.005
F	.655 ±.010	.580 ±.010
G	.215 ±.010	.100 ±.007
H	.430 ±.010	.200 ±.010
J (both leads)	.040 $^{+.003}_{-.002}$	.031 ±.003

1/ All dimensions are in inches

Figure 40-4. Transistor Case Outlines, Power (Lead Mount)



Dimension 1/	Case Size			
	TO-48	TO-60	TO-61	TO-111
A (max)	1.193 2/	.480 3/	.875 2/ 3/	.763 2/ 3/
B (max)	.562	.437	.687	.438
C (max)	.453	.455	.455	.455
D (max)	.2268	.1697	.2268	.1697
E thread size 4/	1/4-28 UNF-2A	10-32 UNF-2A	1/4-28 UNF-2A	10-32 UNF-2A
F (min/max)	.060/.075	7/	.047/.072	.040/.070
G	.145 ±.020	7/	.061 $^{+.016}_{-.015}$ 5/	.055 ±.015 5/
Lead Exceptions	6/	7/	--	8/
Mounting Torque max, in-lbs.	--	12	20	--

NOTES:

1/ All dimensions are in inches.

2/ Orientation of terminals to hexagon is not controlled.

3/ All leads have the same length.

4/ All threads in accordance with Handbook H28.

5/ Collector connected internally to case.

6/ Two eyelet terminals only, whose construction may be L-shaped. Large, longer terminal is cathode; shorter, smaller terminal is gate; and the stud is the anode connection.

7/ Three round leads .038 ±.008 diameter with hemispherical ends (no holes), all electrically isolated from the case.

8/ An alternate 120° orientation of leads may be used.

Figure 40-5. Transistor Case Outlines, Power (Stud Mount)

40.3 Standard MIL-S-19500 semiconductors.

All standard MIL-S-19500 semiconductors are listed by type designation in the following tables:

Table 40-1	Diodes, Small Signal
Table 40-2	Diodes, Switching
Table 40-3	Fast Recovery Power Rectifiers
Table 40-4	Diodes, Power
Table 40-5	Diodes, Voltage Regulator (Zener)
Table 40-6	Regulator Diode Standard Voltages
Table 40-7	Diodes, Voltage Reference (Temperature Compensated)
Table 40-8	Thyristors (Silicon Controlled Rectifiers)
Table 40-9	Transistors, NPN Low Power General Purpose and Switching
Table 40-10	Transistors, PNP Low Power General Purpose and Switching
Table 40-11	Transistors, NPN Medium and High Power
Table 40-12	Transistors, PNP Medium and High Power
Table 40-13	Transistors, Junction Field Effect
Table 40-14	Transistors, NPN Radio Frequency
Table 40-15	Transistors, PN Unijunction
Table 40-16	Photocoupler

Note: Semiconductors are listed in numerical sequence of type designation unless otherwise specified under title.

Table 40-1. Diodes, Small Signal

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA							
			V_{RM} (wkg)	Maximum V_F @ I_F		Max I_R @ Rated V_R		I_o		i_f (surge) @ 1/120 sec
						T_A = 25°C	T_A = 150°C	T_A 25°C	T_A = 150°C	
			V(pk)	Vdc	mAdc	µA	µA	mAdc	mAdc	A
1N645-1	240	DO-14	225	1.0	400	.05	25	400	150	5
1N647-1	240	DO-14	400	1.0	400	.05	25	400	150	5
1N649-1	240	DO-14	600	1.0	400	.05	25	400	150	5

1/ See Figure 40-1 for case outline and dimensions.

70

Table 40-2. Diodes, Switching

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA								REMARKS
			V_{RM} (wkg)	Maximum V_F @ I_F		Max I_R @ Rated V_R		i_f (surge) (1 μs)	t_{rr}	I_o	
						T_A = 25°C	T_A = 150°C				
			V(pk)	Vdc	mA	μA	μA	A(pk)	ns	mA	
1N4148-1	116	d	50	1.0	10	5.0	100	.5	5	200	
1N4150-1	231	d	50	1.0	200	.1	100	4.0	4	200	V_F = .540 to .620Vdc @ I_F = 1mA
1N5711	444	c	50	1.0	15	.2	200	--	2/	15	
1N5712	445	c	16	1.0	35	.15	100	--	2/	35	
1N5719	443	c	100	1.0	100	.25	15	--	3/	100	P-I-N RF Switch

1/ See Figure 40-1 for case outline and dimensions.

2/ Minority carrier lifetime equals 100 ps maximum.

3/ Effective carrier lifetime equals 100 ns minimum.

Table 40-3. Fast Recovery Power Rectifiers
(Listed in order of t_{rr})

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA						REMARKS
			t_{rr}	I_o @ T_A = 25°C *T_A = 55°C **T_C=100°C	V_R	i_f (surge) @ 1/120 sec	Max I_R @ V_R		
							T_A=25°C	T_A = 100°C *T_C = 100°C	
			ns	Adc	Vdc	A(pk)	µA	µA	
1N5802	477	k	25	*1	50	35	1.0	50	Forward Recovery
1N5804	477	k	25	*1	100	35	1.0	50	Time, t_{fr}= 15ns max. for
1N5806	477	k	25	*1	150	35	1.0	50	/477 types (Unitrode)
1N5807	477	m	30	*3	50	125	5.0	150	
1N5809	477	m	30	*3	100	125	5.0	150	
1N5811	477	m	30	*3	150	125	5.0	150	
1N6079	503	n	30	*2	50	175	10.0	500	t_{fr}= 20ns max. for /503
1N6080	503	n	30	*2	100	175	10.0	500	types (Semtech)
1N6081	503	n	30	*2	150	175	10.0	500	
1N5835	484	n	100	*3	30	150	1.0	20	
1N5836	484	n	100	*3	50	150	1.0	20	
1N5615	429	e	150	*1	200	25	.5	25	
1N5617	429	e	150	*1	400	25	.5	25	
1N5417	411	f	150	*3	200	80	1.0	20	
1N5418	411	f	150	*3	400	80	1.0	20	
1N3893	304	DO-4	200	*12	400	150	25.0	*3000	
1N3913	308	DO-5	200	** 30	400	300	80.0	*10000	
1N5420	411	f	400	*3	600	80	1.0	20	

1/ See Figures 40-1 and 40-2 for case outline and dimensions.

78

Table 40-4. Diodes, Power
(Listed in order of I_o, then V_R)

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA						
			V_R	I_o @ T_A *T_C		i_f (surge) @ 1/120 sec	t_{rr} Max	Max I_R at Rated V_R	
								*T_A = 25°C T_C = 25°C	*T_A = 100°C T_C = 150°C
			Vdc	Adc	°C	A(pk)	µs	µA	µA
1N5614 1N5616 1N5618	427	e	200 400 600	1.0	55	25	2	*.5	*25
1N5550 1N5551 1N5552	420	i	200 400 600	3.0	55	50	2	1.0	*20
1N1202A 1N1204A 1N1206A	260	DO-4	200 400 600	12.0	*150	240	-	50.0	1000
1N1184 1N1186 1N1188	297	DO-5	100 200 400	35.0	*150	500	-	--	3000

1/ See Figures 40-1 and 40-2 for case outline and dimensions.

Table 40-5. Diodes, Voltage Regulator (Zener)
(Listed in order of power, then V_Z)

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA					REMARKS
			Power	V_R 2/	ΔBV 3/	I_r (surge)	TCBV	
			mW	Vdc ±5%	Vdc	mA	% per °C	
1N4370A thru 1N4372A	127	DO-7	400	2.4 to 3.0	1.0	1000	-.085 to -.075	
1N746A thru 1N759A	127	DO-7	400	3.3 to 10	1.0 to .4	540 to 1000	-.070 to +.075	
1N962B thru 1N992B	117	DO-7	400	11 to 200	.50 to 12.0	9 to 175	+.073 to +.110	
1N4614 thru 1N4627	435	DO-7	400	1.8 to 6.2	--	1300 to 3200	-.075 to +.050	Noise Density N_D = 1 to 5μV/$\sqrt{Hz}$
1N4099 thru 1N4135	435	DO-7	400	6.8 to 100	--	230 to 1300	+.060 to +.100	N_D = 40μV/$\sqrt{Hz}$
1N4460 thru 1N4483	406	b	1500	6.2 to 56	.35 to 2.5	260 to 2300 (T_A=100°C)	+.050 to +.096	
1N4954 thru 1N4989	356	p	5000	6.8 to 200	.7 to 18.0	500 to 40,000 (T_A=25°C)	+.050 to +.110	Power of 5,000 mW with proper heat sink

1/ See Figure 40-1 for case outline and dimensions.

2/ See Table 40-6 for standard voltages.

3/ ΔBV is the voltage difference between test points at 10% of rated I_Z, and 50% of rated I_Z.

74

Table 40-6. Regulator Diode Standard Voltages

V_Z (nom)	MIL-S-19500/				
	117 1/	127 1/	435	406	356
Vdc	400 mW	400 mW	400 mW	1.5 W	5.0 W
1.8			1N4614		
2.0			1N4615		
2.2			1N4616		
2.4		1N4370A	1N4617		
2.7		1N4371A	1N4618		
3.0		1N4372A	1N4619		
3.3		1N746A	1N4620		
3.6		1N747A	1N4621		
3.9		1N748A	1N4622		
4.3		1N749A	1N4623		
4.7		1N750A	1N4624		
5.1		1N751A	1N4625		
5.6		1N752A	1N4626		
6.2		1N753A	1N4627	1N4460	
6.8		1N754A	1N4099	1N4461	1N4954
7.5		1N755A	1N4100	1N4462	1N4955
8.2		1N756A	1N4101	1N4463	1N4956
8.7		---	1N4102	---	---
9.1		1N757A	1N4103	1N4464	1N4957
10.0		1N758A	1N4104	1N4465	1N4958
11.0	1N962B	---	1N4105	1N4466	1N4959
12.0	1N963B	1N759A	1N4106	1N4467	1N4960
13.0	1N964B		1N4107	1N4468	1N4961
14.0	---		1N4108	---	---
15.0	1N965B		1N4109	1N4469	1N4962
16.0	1N966B		1N4110	1N4470	1N4963
17.0	---		1N4111	---	---
18.0	1N967B		1N4112	1N4471	1N4964
19.0	---		1N4113	---	---

V_Z (nom)	MIL-S-19500/				
	117 1/	127	435	406	356
Vdc	400 mW	400 mW	400 mW	1.5 W	5.0 W
20	1N968B		1N4114	1N4472	1N4965
22	1N969B		1N4115	1N4473	1N4966
24	1N970B		1N4116	1N4474	1N4967
25	---		1N4117	---	---
27	1N971B		1N4118	1N4475	1N4968
28	---		1N4119	---	---
30	1N972B		1N4120	1N4476	1N4969
33	1N973B		1N4121	1N4477	1N4970
36	1N974B		1N4122	1N4478	1N4971
39	1N975B		1N4123	1N4479	1N4972
43	1N976B		1N4124	1N4480	1N4973
47	1N977B		1N4125	1N4481	1N4974
51	1N978B		1N4126	1N4482	1N4975
56	1N979B		1N4127	1N4483	1N4976
60	---		1N4128		---
62	1N980B		1N4129		1N4977
68	1N981B		1N4130		1N4978
75	1N982B		1N4131		1N4979
82	1N983B		1N4132		1N4980
87	---		1N4133		---
91	1N984B		1N4134		1N4981
100	1N985B		1N4135		1N4982
110	1N986B				1N4983
120	1N987B				1N4984
130	1N988B				1N4985
150	1N989B				1N4986
160	1N990B				1N4987
180	1N991B				1N4988
200	1N992B				1N4989

1/ The 1N962B-1 through 1N992B-1 and 1N753-1 through 1N759A-1 are assigned to these specifications having metallurgically bonded construction, but are not yet qualified. When they become qualified, their use is recommended.

75

Table 40-7. Diodes, Voltage Reference (Temperature Compensated)
(Listed in order of BV min, then ΔBV)

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA						
			Voltage Temperature Stability ΔBV 2/	BV Min	BV Max	Dynamic Impedance Z @ I_Z		I_{ZM}	Power
			Vdc	Vdc	Vdc	Ohm	mA	mA	mW
1N821	159	DO-7	.096	5.90	6.50	15	7.5	35	250
1N823			.048						
1N825			.019						
1N827			.009						
1N829			.005						
1N4565A	452	DO-7	.100	6.08	6.72	200	.5	60	400
1N4566A			.050						
1N4567A			.020						
1N4568A			.010						
1N4569A			.005						
1N4570A			.100			100	1.0		
1N4571A			.050						
1N4572A			.020						
1N4573A			.010						
1N4574A			.005						
1N935B	156	DO-7	.184	8.55	9.45	20	7.5	50	500
1N937B			.037						
1N938B			.018						
1N939B			.009						

1/ See Figure 40-1 for case outline and dimensions.

2/ ΔBV is the maximum voltage difference measured between temperatures given in the specification at rated I_Z.

Table 40-8. Thyristors (Silicon Controlled Rectifiers)
(Listed in order of I_o, then V_{DRM})

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA											
			V_{DRM} 3/	Max I_o @ T_A *T_C		i_{FM} (surge)	V_{GT}		I_{GT}		v_{FM}		I_{HOX} *I_{HOO}	
						Max	Min	Max	Min	Max	Min	Max	Min	Max
			V	A	°C	A(pk)	Vdc		mAdc		V(pk)		mAdc	
2N3027 2N3028 2N3029	419	TO-18	30 60 100	.175	100	8	.4	.8	-5	200	.8	1.5	.3	5.0
2N3030 2N3031 2N3032			30 60 100	.175	100	8	.44	.6	-5	20	.8	1.5	.3	4.0
2N2323 2/ 2N2324 2/ 2N2326 2/ 2N2328 2/ 2N2329	276	TO-5	50 100 200 300 400	.22	80	15	.1	1.0		.350		2.2		2.0
2N682 2N683 2N685 2N687 2N688 2N689	108	TO-48	50 100 200 300 400 500	16	*65	150	.23	3.0		80.0		2.0		*50.0

1/ See Figure 40-3 and 40-4 for case outline and dimensions.

2/ "A" versions have trigger values of V_{GT} = .1 to .9 Vdc @ I_{GT} = .075 mAdc max.

3/ This parameter is identified as V_{FBXM} or V_{FBOM} in older specifications.

Table 40-9. Transistors, NPN Low Power General Purpose and Switching

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA								REMARKS
			P	I_C	$BV_{CBO/CEO/EBO}$			h_{FE}		@ I_C	f_t Min	
			mW	mA	Vdc			Min	Max	mA	MHz	
2N718A	181	TO-18	500	500	75	30	7.0	40	120	150	60	
2N930	253	TO-18	300	30	60	45	6.0	100	300	.01	45	
2N2219A	251	TO-5	800	800	75	50	6.0	100	300	150	250	Complement of 2N2905A
2N2222A	255	TO-18	500	800	75	50	6.0	100	300	150	250	Complement of 2N2907A
2N2369A	317	TO-18	360	---	40	15	4.5	40	120	10	250	
2N2432A	313	TO-18	300	100	45	45	18.03/	80	400	1	40	Highspeed chopper
2N2484	376	TO-18	360	50	60	60	6.0	200	500	10	60	
2N3019	391	TO-5	800	1,000	140	80	7.0	100	300	150	100	
2N3421	393	TO-5	1,000	3,000	125	80	8.0	40	120	1,000	40	
2N4150	394	TO-5	1,500	10,000	100	70	7.0	40	120	5,000	15	
2N5662	454	TO-5	1,200 2/	2,000	250	200	6.0	40	120	500	20	
2N5663	454	TO-5	1,200 2/	2,000	400	300	6.0	25	75	500	20	
2N5666	455	TO-5	1,200 2/	5,000	250	200	6.0	40	120	1,000	20	
2N5667	455	TO-5	1,200 2/	5,000	400	300	6.0	25	75	1,000	20	

1/ See Figure 40-3 for case outline and dimensions.

2/ Rated at P_T = 15W max at T_C = 100°C.

3/ BV_{ECO}

86

Table 40-10. Transistors, PNP Low Power General Purpose and Switching

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA									REMARKS
			P	I_C	$BV_{CBO/CEO/EBO}$			h_{FE}	@	I_C	f_t Min	
			mW	mA	Vdc			Min	Max	mA	MHz	
2N2905A	290	TO-5	600	600	60	60	5	100	300	150	200	Complement of 2N2219A
2N2907A	291	TO-18	400	600	60	60	5	100	300	150	200	Complement of 2N2222A
2N2946A	382	TO-46	400	100	40	35	40	50	---	1	5	High speed chopper
2N3251A	323	TO-18	360	200	60	60	5	100	200	10	300	
2N3637	357	TO-5	1000	1000	175	175	5	100	300	50	200	
2N3868	350	TO-5	1000	3000	60	60	4	30	150	1500	60	Complement of 2N3507
2N4957	426	TO-72	200	30	30	30	3	30	150	5	1200	NF = 3dB @ 450MHz
2N5416	485	TO-5	750	1000	350	300	6	30	120	50	15	t_{on} = 1μs, t_{off} = 10μs

1/ See Figure 40-3 for case outline and dimensions.

79

Table 40-11. Transistors, NPN Medium and High Power

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA										REMARKS
			P_T @ T_C		I_C	$BV_{CBO/CEO/EBO}$			h_{FE} @ I_C			f_t Min	
			W	°C	A	Vdc			Min	Max	A	MHz	
2N1724	262	TO-61	50	100	5	175	80	10	30	90	2	10.0	
2N2814	415	TO-61	50	100	10	120	80	8	50	150	1	15.0	
2N2880	315	TO-111	30	100	5	110	80	8	40	120	1	20.0	
2N3055	407	TO-3	117	25	15	100	70	7	20	60	4	.8	
2N3585	384	TO-66	35	25	2	500	300	6	25	100	1	15.0	
2N3716	408	TO-3	150	25	10	100	80	7	30	120	3	4.0	Complement of 2N3792
2N3739	402	TO-66	10	100	3	350	300	6	25	---	.25	10.0	
2N3772	413	TO-3	150	25	20	100	60	7	15	60	15	.6	
2N3999	374	TO-111	30	100	5	100	80	8	80	240	1	40.0	
2N5157	371	TO-3	100	75	3.5	700	500	6	30	90	1	2.5	
2N5303	456	TO-3	200	25	20	80	80	5	15	60	10	2.0	Complement of 2N5745
2N5664	455	TO-66	30	100	5	250	200	5	40	120	1	20.0	
2N5665	455	TO-66	30	100	5	400	300	5	25	75	1	20.0	

1/ See Figure 40-4 and 40-5 for case outline and dimensions.

80

Table 40-12. Transistors, PNP Medium and High Power

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA											REMARKS
			P_C @ T_C		I_C	$BV_{CBO/CEO/EBO}$			h_{FE} @ I_C			f_t Min		
			W	°C	A	Vdc			Min	Max	A	MHz		
2N3741	441	TO-66	25	25	4	80	80	7	30	125	.25	4		
2N3792	379	TO-3	150	25	10	80	80	7	30	120	3.0	4		Complement of 2N3716
2N5745	433	TO-3	200	25	20	80	80	5	15	60	10.0	2		Complement of 2N5303
2N6211	461	TO-66	35	25	2	275	225	6	30	175	1.0	20		

1/ See Figure 40-5 for case outline and dimensions.

Table 40-13. Transistors, Junction Field Effect (FET)

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA									
			Channel	P_T	V_{DG}	I_C	Y_{fs}		$V_{GS(OFF)}$		t_{on}	t_{off}
							Min	Max	Min	Max		
				mW	Vdc	mA	µmhos		Vdc		ns	ns
2N3823	375	TO-72 2/	n	300	30	10	3200	6500	--	8	--	--
2N4416A	428	TO-72 2/	n	300	35	10	4500	7500	2.5	6.0	--	--
2N4856	385	TO-18 2/	n	360	40	50	--	--	4	10	9	25
2N4857	385	TO-18 2/	n	360	40	50	--	--	2	6	10	50
2N5114	476	TO-18 3/	n	500	30	50	--	--	5	10	16	6

1/ See Figure 40-3 for case outline and dimensions.

2/ For these cases, the transistor emitter, base, and collector leads become the FET source, drain, and gate leads respectively.

3/ For this case, the standard transistor emitter, base, and collector leads become the FET source, gate, and drain leads respectively.

82

Table 40-14. Transistors, NPN Radio Frequency

TYPE NUMBER	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA											REMARKS
			f_t		P_T @ T_C *T_A		I_C	$BV_{CBO/CEO/EBO}$			h_{FE} @ I_C			
			Min	Max										
			MHz		W	°C	A	Vdc			Min	Max	mA	
2N918	301	TO-72	600		.3	25	.05	30	15	3	20	200	3	
2N2857	343	TO-72	1000	1900	.3	25	.04	30	15	3	30	150	3	NF = 4.5dB max @ f = 450 MHz
2N3375	341	TO-60	350		11.6	25	1.5	65	40	4	15	150	150	P_{out} = 3 to 6W @ 400 MHz
2N3553	341	TO-39	350		7.0	25	1.0	65	40	4	15	150	150	
2N3866A	398	TO-39	800	1500	1.0	*25	.4	60	30	3.5	25	200	50	P = 1 to 2W @ 400 MHz
2N5109	453	TO-39	1200	1800	1.0	*25	.4	40	20	3	40	120	50	Power Gain = 11dB min @ 200 MHz, NF = 3dB @ 200 MHz

1/ See Figures 40-3 and 40-4 for case outline and dimensions.

Table 40-15. Transistors, PN Unijunction

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA								
			P	I_e	R_{BBO} Kohms		η		$I_{B2(Mod)}$		$V_{EB1(Sat)Max}$
									Min	Max	
			mW	mA	Min	Max	Min	Max	mA		Vdc
2N491A	75	TO-5	600	70	4.7	6.8	.56	.68	6.8	22	4.3
2N4948	388	TO-18	360	50	4.0	12.0	.55	.82	12.0	--	3.0

1/ See Figure 40-3 for case outline and dimensions. The transistor emitter and base leads are the unijunction emitter and base-1 leads respectively. The third lead is base-2, internally connected to the case, and located in the position of the fourth lead for a TO-72 package. No lead occupies the transistor collector lead position.

84

Table 40-16. Photocoupler

TYPE JANTX	MIL-S-19500/	CASE SIZE 1/	ELECTRICAL DATA														
			Total Coupled Device 2/					LED				Phototransistor					
			$I_{C(on)}$ @		t_r and t_f	R_{IO} Min	C_{IO} Max	I_F Max	I_p	I_R @ V_R		$BV_{CBO/CEO/EBO}$			$I_{C(off)}$	$V_{CE(sat)}$	
			I_F = 10mA	I_F = 2mA													
			mA	mA	µs	Ohm	pF	mA	A(pk)	µA	Vdc	Vdc			nA	Vdc	
4N23	486	TO-99 3/	6.0	0.2	15	10^{11}	5	40	1	100	2	35	35	4	100	0.3	
4N24	486	TO-99 3/	10.0	0.4	20	10^{11}	5	40	1	100	2	35	35	4	100	0.3	

1/ See Figure 40-3 for case outline and dimensions.

2/ A gallium arsenide LED is optically coupled to a silicon NPN phototransistor.

3/ Leads 4 and 8 are not present on this case. Leads 1, 2 and 3 are emitter, base, and collector respectively of the phototransistor. Leads 5 and 7 are the anode and cathode respectively of the LED. No connection to lead 6.